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E-Government in Amarah: Challenges and Recommendations for Future Implementation

Reem Jabbar Abdulbaqi
rja6161@rit.edu

E-Government in Amarah: Challenges and Recommendations for Future Implementation

By

Reem Jabbar Abdulbaqi

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Student Name: Reem J. Abdulbaqi
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~ MS Thesis Committee ~

Name	Signature	Date
Prof. Charles Border Chair		
Prof. Sylvia Perez-Hardy Committee Member		
Prof. Daniel Kennedy Committee Member		

DEDICATION

This thesis work is dedicated to my parents and my brother Mohamed who have always loved me unconditionally.

Also, this work is dedicated to my little brother Munaf who has gone forever away from our life and left a void never to be filled in our lives. May you find peace and happiness in Paradise!

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ABSTRACT

The growth and changes in the 21st century in the sectors of economics, politics, and technology mean that governments must provide all the services that can serve the demands of their citizens. One way for governments to facilitate this is by implementing e-government. E-government migrates services previously implemented by government employees to internet connected systems accessible by citizens from wherever they are at whatever time they are needed. This system can connect citizens to the government ministries via rule-based systems. Amarah, a city in the south of Iraq, started to integrate electronic systems into the facilities of the city in 2005. In 2012, the Amarah Provisional Council began the first step to build the e-government for the city by working with the UN, but the e-government systems still have not been built because the Council of Amarah is trying not to fall into the same mistakes of other e-government projects in the country. The purpose of this study is to cover some of the challenges that face governments in implementing e-government in developing countries. Another goal is to provide a comparative study to analyze the successful implementations of e-government in such places as South Korea, Bahrain, and Australia. Moreover, this thesis presents a workable framework to implement an e-government system which is suitable to the current situation of the city of Amarah, Iraq because existing successful e-government models or frameworks cannot be adopted as is and be expected to work successfully because of financial, cultural, political, educational, and other differences that exist between the locations.

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Chapter 1: Introduction

1.1 Introduction

Many governments seek to offer the most effective ways to provide services to their citizens. One of these ways is implementing e-government. E-government seeks a new solution to problems in information technology and providing services. “The major aim of [e-government] is to break the man-made boundaries of time and location by applying information technology to achieve the informational transition of the government faculty, to enable people to acquire information from different sources and enjoy the service,” (Zhu, 2009). In other words, implementing e-government for cities that face many challenges with such things as unemployment, crime, health care, and education. All of this can serve both citizens (rich and poor) and government ("Why is e-Government Important?", 2015).

After 2003, Iraq began working to rebuild the country in all aspects of life, especially in technology. Building e-government for a country like Iraq is not easy for many reasons because of lack of security (computer hacking and terrorist attacks), lack of human resources, and lack of finances. Therefore, Iraq is not able to provide the appropriate environment to implement a project such as e-government. For that, Iraq is looking for help from some organizations that have experience in dealing with the critical situation in Iraq, and in this case the help will be from the United Nations (UN). In June 2004, the UN asked the Italian Minister for Innovation and Technologies to work with the Iraqi government to build an e-government by providing technical and financial help, and thus the two countries signed a Memorandum of Understanding (Al-dabbagh, 2011).

The implementation of E-government in Iraq differs from one city to another. Each city has different policies, challenges, requirements, and needs for people to interact with technology. Amarah is a city in the province of Maysan on the Tigris River in the south central part of Iraq. Since 2011, the Amarah Provisional Council suggested to begin the next step to improve the ICT sector of the city by implementing e-government. Until this year, there is no physical implementation of the project. The Council is still searching and preparing a team that can manage and build e-government. The goal of this project is to facilitate the processes for Amarah citizens, save the city the time and the money to process services, and to eliminate the corruption.

The problem for some countries in the developing world is that following the same strategies that have worked for other countries to implement an e-government project can be less successful because of the differences between the countries. Some of the issues that can cause problems include: cultural, financial, political, environmental situations, and involve ICT infrastructure and ICT literacy. For this reason, this thesis aims to determine the expected challenges for future implementation, which can be done by using PEST analysis. Also, even though there are many successful implementations, Amarah should be careful and not follow the other exact implements; for that, my thesis covers some of these successful projects and focuses on strategies that can help Amarah Council. Moreover, this research suggests an e-Government Interoperability Framework that can suit the city case.

1.2 Background of Iraq

1.2.1 Iraq Profile

The Republic of Iraq is a country located in Western Asia. Iraq is bordered from the North by Turkey, East by Iran, South by Saudi Arabia, West by Syria, Southeast by Kuwait, and Southwest by Jordan. Iraq has 18 governorates (provinces), and the capital of Iraq is the largest one, Baghdad. Figure 1 shows the geographic of Iraq.

Figure 1. Map of Iraq. Reprinted from Iraq _ history - geography in Encyclopaedia Britannica, by R. Chambers, H. Kennedy, G. Blake, J. Woods, & M. Khadduri, 2016, Retrieved September 23, 2016, from https://www.britannica.com/place/Iraq. Copyright 2012 by Encyclopaedia Britannica. Reprinted with permission.

Iraq is a very diverse country with many ethnic groups including Arabs, Armenians, Assyrians, Chaldeans, Circassians, Kurds, Mandaens, Shabakis, Turkomen and Yazidis ("Ethnic and Religious Groups In Iraq - US - Iraq War - ProCon.org", 2009).

Also, Iraq has many religions followed by its peoples. The major religion in Iraq is Islam, followed by Christianity, Yezidism, Shabak, and Mandeanism (Kjeilen, n.d.). Iraq has two official languages: Arabic and Kurdish. Other languages include Turkmen, Syriac and Armenian (Ahmad, Norouzi, Schmelling, & Taenner, 2015). The population of the country is 37,976,697, based on the latest United Nations estimates.

1.2.2 History and Politics

In reference (*COUNTRY PROFILE: IRAQ*, 2006), Iraq is a rich country with many natural resources and situated between two rivers, the Tigris and Euphrates. Iraq was created as a country around 10,000 BC from a region that historically has been called Mesopotamia. The history of what would later come to be called Iraq began before 6000 B.C. when Sumerians settled in Sumer (currently southern Iraq). In the 18th century B.C., the Babylonian kingdom was founded in modern-day Babylon. In 16th century B.C., the king Mursili, was the king of the Hittites at that period, destroyed the Babylonians. In 9th century B.C., Semitic Assyrians, which originated in northern Mesopotamia and their capital Nineveh, Nineveh Governorate was on the Tigris River. In 539 B.C., Mesopotamia became part of the Persian Empire under the control of Cyrus the Great. During this period, there were many inventions and developments such as the wheel, astronomy, writing, chariot, sailboat, mathematics and irrigation.

From 1534 to 1918, Iraq was under the control of the Ottoman Empire. In 1917, the British defeated the Ottomans and occupied Iraq. British rule did not last uncontested very long and the Iraqi tribes began their revolution in 1920, gaining independence from the British in 1932. However, the conflicts between Shia-Sunni and the ambitions of others such as Kurds and Assyrians to gain power, lead the British to reoccupy Iraq again in 1941. In 1958, Abd-al-Karim Qasim and Abd-al-Salam Muhammad Arif ended the monarchy in Iraq. Abd-al-Salam Muhammad Arif became president in 1963 until 1966, then Ahmad Hasan al-Bakr from 1968 till 1979. From 1979 till 9 April 2003, Saddam Hussein was the president of Iraq ("Iraq profile - timeline - BBC News", 2016).

The US invasion began on March 19th 2003. After the war ended the terrorists took control all over Iraq, especially after 2005. Their target was to destroy the infrastructure of the country by bombing the ministries, schools, and historical and holy places to increase the conflicts between the Iraqi people. Also, their target was killing and kidnapping many doctors, engineers, and professors. In reference **(**Fortin, 2013), from 2003 to 2006, 40% of Iraqi professionals left the country. In 2016, the war is still not ended. Iraqi people have to fight the terrorists around the country and especially the ISIS in the north of Iraq, and fight the corruption that slows the development process.

1.2.3 Economy

The economy in Iraq is currently dominated by oil exports. Instability in the price of oil combined with the current state of insecurity caused by the rise of Isis has led to instability in the country financially, as well as instability in the political process and other political issues.

All these have affected the ability of the country to develop in many different sectors such as health, education, and technology. Iraq hopes that increasing oil prices and providing a secure environment by ending the conflict with ISIS will improve the Iraqi economy ("The World Factbook — Central Intelligence Agency", n.d.).

Another negative force impacting the governance of Iraq is the Corruption that has become endemic to the government and has had a direct negative effect on the Iraqi economy. According to the Transparency International in its Corruption Perception Index (CPI), Iraq ranks 161 out of 168 countries ("Corruption", n.d.). In reference (Mamouri, 2016), in 2014 the World Bank statistics stated that only 11% of Iraqis have a bank account because of the poverty and the high percentage of unemployment. Also, the banking system in Iraq is very bureaucratic, taking a long process to open a bank account or to process a simple service. Moreover, due to governmental instability, Iraqi banks are not allowed to provide credit or debit cards, which has a negative impact people's ability to access their funds through an ATM.

1.2.4 ICT Infrastructure

Because of the war situation begun in 2003 and the following political and economic instability, the ICT infrastructure for the country has never really developed. Now, Iraq is trying to rebuild the country again regardless of politics, economics, and corruption problems.

The Minister of Communication of Iraq is responsible for building the ICT infrastructure for the country. After 2003, the ministry installed the first mobile telephones and broadband

internet. After 2007, the ministry laid out 12,000 km of fiber optics cables with Dense Wavelength Division Multiplexing (DWDM) technology that would cover up to 20,000 square km in 2012. Also, they installed two microwave routers, one from the north to the south, and the another one from the middle to the west. Moreover, the other plan of the ministry was to setup submarine cables to connect Iraq with its neighbors, Syria, Jordan, Saudi Arabia, Kuwait, Iran and Turkey.

1.2.5 E-government in Iraq

After 2003, one of the Iraq plans was to improve the ICT infrastructure of the country and to increase the ICT literacy by enhancing the government's implementation of e-government. However, because of the political and financial issues, lack of experiences in this field and lack of ICT knowledge, Iraq was unable to implement it. For that, the Iraqi government had to ask for help from the UN.

In 2004, the UN asked their members to provide a support for Iraqi government. The Italian Ministry of Innovation and Technology worked with the Iraqi Ministry of Science of Technology to implement the e-government project by signing a Memorandum of Understanding (MOU). From 2007 to 2010, there was an agreement signed between the United States Agency for International Development (USAID) and the Iraqi of Science and Technology to develop the e-government project in Iraq. From 2004 until 2010, both Iraqi ministries (Ministry of Science and Technology, and the Ministry of Communication) worked together to enhance the ICT infrastructure and to get ready to implement the e-government project. However, the e-government project was not implemented because the ICT

infrastructure is still weak and could not manage and control a project such as the e-government project. Also, the ICT literacy is slow because of the expense of owning a computer and internet connection. Moreover, the resistance from the employees to implement the project was difficult because of political, security or ethnic reasons (Al-Taie & Kadry, 2013). In reference (Ibrahim, 2014), the Iraqi portal launched in 2010 contains only information and few forms to download, such as for passports and driver licenses. There were few initiatives from some ministries to move their traditional system to the electronic system. The Ministry of Health, for example, tried to create a database for the patients. Also, some ministries tried to provide online services to facilitate the process for other services

1.3 Background of Amarah

1.3.1 Amarah Profile

Amarah is the administrative center of the Maysan province located in the South-Eastern of Iraq, close to the Tigris River. It shares a border with Iran. The majority of people are Shia Muslim, and the ethnic groups are Arabs and Mandaens. The population in 2012 was 511,542. The official language is Arabic ("Amarah", n.d.). Figure 2 shows the location of Amarah in the map of Iraq.

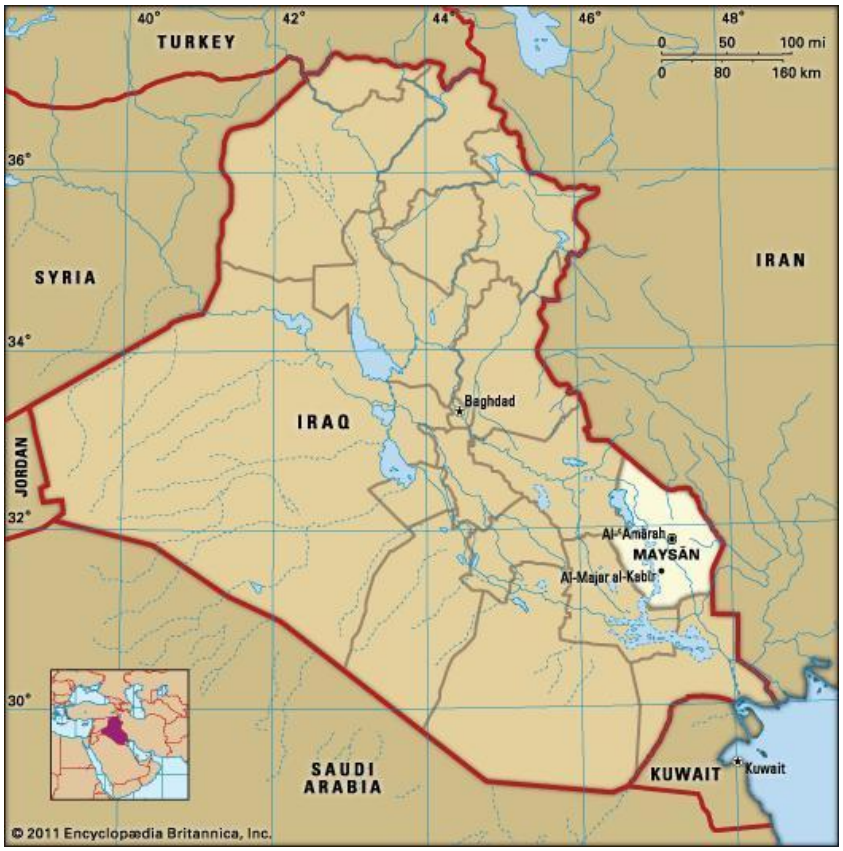

Figure 2. Map of Iraq (Amarah Location) Reprinted from Al-Amarah In Encyclopaedia Britannica, by The Editors of Encyclopædia Britannica, 11-28-2011, Retrieved September 23, 1016, from https://www.britannica.com/place/Al-Amarah. Copyright 2011 by Encyclopaedia Britannica. Reprinted with permission.

1.3.2 E-government in Amarah

The e-government project in this city began in 2012 in cooperation with the United Nations Development Program (UNDP). Amarah Provisional Council established the e-government Department and researched to manage, build, and control e-government services. They faced many political, economic and security challenges in implementing this project. All these reasons caused the people responsible for this project to slow down the implementation until they could solve some of the challenges. Many employees from the e-government department took courses to understand the whole picture of building an e-government system. Also, the

department hired many people in various majors who have experience in this field because the reason that many e-government projects failed in some cities is lack of the right people in the right position.

1.4 Thesis Objectives

This thesis aims to point out on some of the challenges that Amarah must face during their process to build the e-government. It aims to show that following the same steps of other success implementations can end with a disaster for Amarah in general because of the country's critical situation.

Chapter 2: Literature Review

2.1 Definition of e-government

There is no global definition of e-government. Researchers and scholars have several arguments about the standard for the definition of e-government. For that, they have defined e-government in many different ways; some of them see e-government as a goal and others see it as a tool to achieve goals (Yildiz, 2007).

In reference (Mofleh, 2008), Mofleh mentioned that there are many reasons why the differences in e-government definitions as the following:

- Each country defines e-government differently from other countries relating to their political systems.
- Defining e-government from technical, culture, and managerial perspectives.
- Defining e-government depending on the stockholders in businesses.
- Some researchers define e-government regarding to its function, such as e-services, e-democracy, and e-governance.

In reference (Cook, LaVigne, Pagano, Dawes, & Pardo, 2002), the researchers defined e-government depending on the use of ICT to enforce the government systems and facilitate the citizens' process. Regarding to this reason, e-government has four dimensions which are e-services that are delivered services over the Internet. E-management is used to support and improve the management of government, e-democracy is used to improve and increase the citizen participation in the decision-making, and e-commerce that is used for transaction money over the Internet for goods and services.

Also, the use of ICT can enhance the public sector agencies, which lead to increasing the efficiency and effectiveness of the public sector processes (Heeks, 2003). For the researcher Bhatnagar and his colleagues (Bhatnagar, 2002), e-government is a way to share information and deliver services, and the result of using e-government is to reduce corruption, cost and time, and to increase transparency and revenue. In reference (Hahamis, Iles, & Healy, 2005), the author Hahamis and his colleagues defined e-government from the governmental perspective, which is a way to deliver government services to improve the administrative efficiency. In reference (Gichoya, 2005), Gichoya was trying to define e-government from the citizens' perspective. He said that e-government is a way to facilitate the access of citizens to the government information and services online at any time and from anywhere.

2.2 Stages of e-government

The implementation of e-government from the point of view some researchers can be a linear progression, following steps in order to complete the implementation (Soliman, 2007). In reference (*Promoting e-government applications towards an Information Society in ESCWA member countries,* 2003), this reference mentioned that there are many researchers think that it not necessary to follow the steps in order. Moreover, there is no fixed number of stages to implement e-government due to many factors such as cultural, economic, technology, and political. Tables from 1 to 4 show different numbers for the stages of e-government.

Table 1
The 3 Stages of E-government

3 Stages	Perception	References
Stage 1: Publish	Stage 1: publish the information about the government online.	(Al-Shafi, 2009; Attohoun et al., 2002)
Stage 2: Interact	Stage 2: interaction the citizens with their government online.	
Stage 3: Transact	Stage 3: citizens can do all the transaction over the internet.	

Table 2
The 4 Stages of E-government

4 Stages	Perception	References
Stage 1: Availability	Stage 1: creating a website to provide all the information about the activities of government.	(AlShihi, 2006)
Stage 2: Interaction	Stage 2: providing ways like email or chat for citizens to interact with their government.	
Stage 3: Transactions	Stage 3: facilitation of online transactions of such things as tax or fee payments.	
Stage 4: Final Transformation	Stage 4: all the activities can be done electronically.	
Stage 1: Presence	Stage 1: the simplest stage required to create a website to provide information about the government activities and departments.	(*Promoting e-government applications towards an Information Society in ESCWA member countries*, 2003)
Stage 2: Interaction	Stage 2: the way that citizens can work with the government through electronic forms.	
Stage 3: Transaction	Stage 3: one-way communication can be with government or citizens depending on the activity.	
Stage 4: Transformation	Stage 4: the most difficult stage to implement because it is two-way communication.	

Table 3
The 5 Stages of E-government

5 Stages	Perception	References
Stage 1: Emerging Presence	Stage 1: establishing a website for the government with a limited presence. It provides organizational or political information.	(Soliman, 2007)
Stage 2: Enhanced Presence	Stage 2: the website expands in this stage and includes more specific information about the government and its departments.	
Stage 3: Interactive Presence	Stage 3: in this stage, there will be a way to interact between citizen, business and government.	
Stage 4: Transactional	Stage 4: citizens can do the transaction online easily and securely.	
Stage 5: Seamless or Fully Integrated Presence	Stage 5: The work across the e-government becomes more seamless because of the integration between the organizations, removing all boundaries.	
Stage 1: Simple Information Age	Stage 1: providing basic information about the government.	(Al-Shafi, 2009)
Stage 2: Request and Response	Stage 2: supporting the interaction between citizens and government.	
Stage 3: Service and Financial	Stage 3: transactions between citizens and government, or between business and government.	
Stage 4: Integration	Stage 4: integration of the government services to smooth the process of these services over the Internet.	
Stage 5: Political Participation	Stage 5: encouraging citizens to be involved politically. For example, through voting.	

Table 4
The 6 Stages of E-government

6 Stages	Perception	References
Stage 1: Information Publish/Dissemination	Stage 1: spreading information over the government portal for citizens.	(Irani, Al-Sebie, & Elliman, 2006)
Stage 2: Official Two-way Transaction	Stage 2: government can secure the two-way transactions by using for an example digital signatures.	
Stage 3: Multi-purpose Portals	Stage 3: the integration between the government departments helps to provide one point to access many services through the portal.	
Stage 4: Portal Personalization	Stage 4: citizens can customize the portal according to their desires.	
Stage 5: Clustering of Common Services	Stage 5: government is trying to provide seamless services by enhancing the collaboration between the government agencies and departments.	
Stage 6: Full Integration/Enterprise Transaction	Stage 6: at the final stage, a full service center is provided that unifies a package of the services provided to citizens.	

2.3 Layers of e-government

Designing e-government layers depends on all the aspects to implement a successful framework. There are many different ways to design the layers depending on different aspects, such as priorities, technology, and other reasons. The following figure is the layered framework for the implementation of e-government services for Pune City (Kumbhar, 2012).

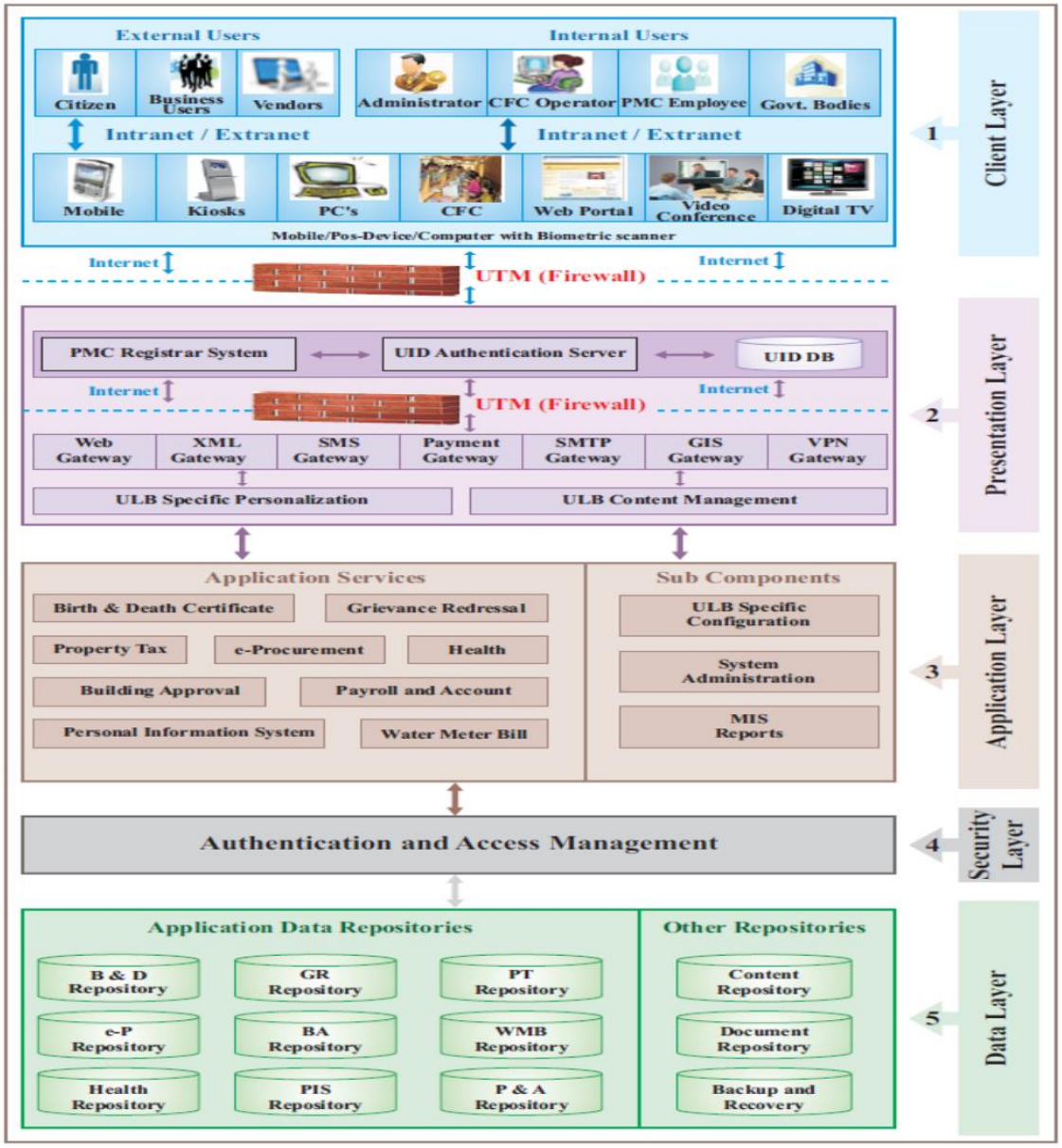

Figure 3. The layered framework for Pune City. Reprinted from ”A critical study of implication of e-governance services for effective communication with special reference to Citizens in Pune City,” by M. A. Kumbhar, 2012, Reprinted with permission.

As shown in the figure 3 there are five layers. The first layer is called Client Layer. This layer includes the delivery channels of different e-government applications with the users. The delivery channels can be mobiles, kiosks, personal computers, and other ways to access the government portal. Users include external users and internal users, external users refer to the

citizens, vendors, and business users, and the internal users refer to government employees. The second layer is the presentation layer, which is used to manage the interface to connect citizens with the government portal. The third layer is the application layer that includes services such as birth and death registration, assessment and payment of tax, and building approval. The fourth layer is the security layer. This is used to authenticate access for the authorized users and to identity management, which is crucial to provide reliable delivery of the government services over the Internet. The fifth layer is the data layer. It is a database, such as application data repositories. For Pune City, according to the author Kumbhar, cloud computing has been used for implementation because of the cost.

There is another approach to design the layered framework for an e-government, such as in reference (Kaur, 2006), the proposed layered framework contained six layers which are: User Access, User Interface, Portal Authentication, Application, Information / Data Store, and an Infrastructure layer. Figure 4 Shows the proposed layered framework.

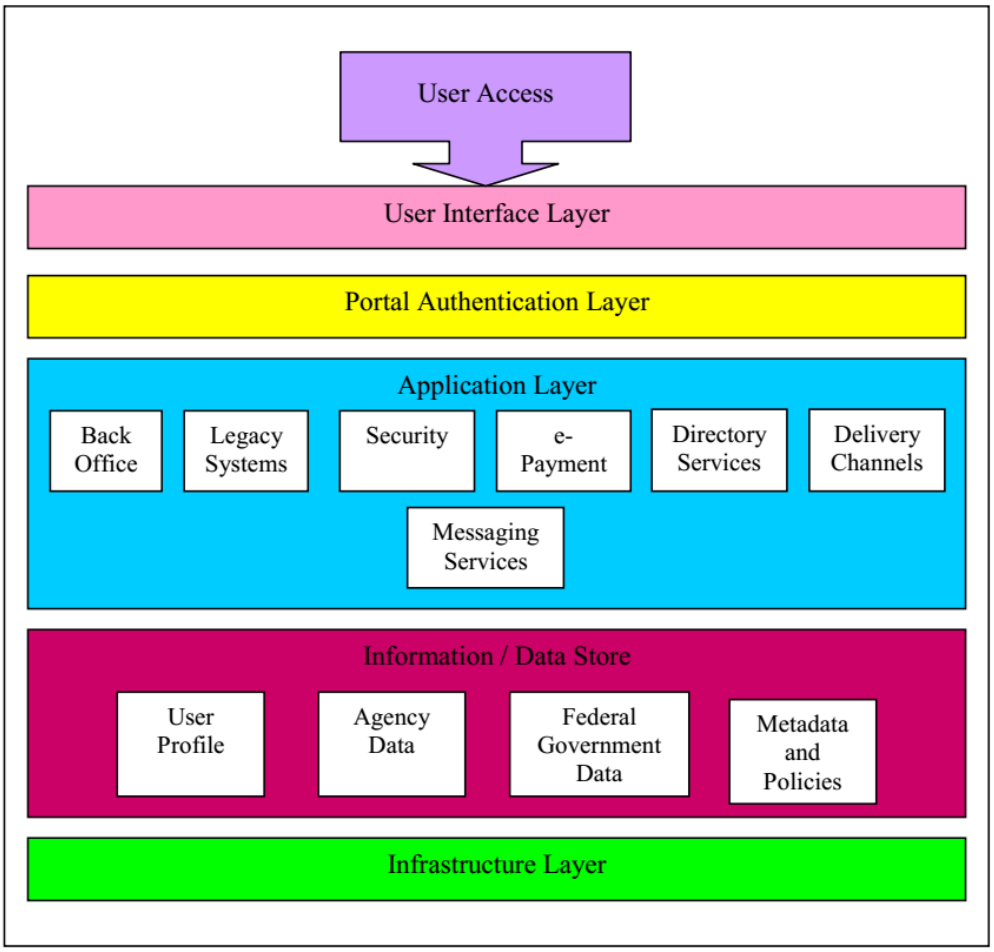

Figure 4. The proposed layered framework. Reprinted from *Malaysian e-Government Implementation Framework* (p. 88), by R. Kaur, 2006. Reprinted with permission.

The first layer, User Access layer, refers to the access way through a browser such as Mozilla Firefox. The second layer is User Interface layer, which refers to the services that are available on the portal like eCitizen, eBusiness, eEmployee, eGovernment, and visitors. The third layer is Portal Authentication Layer, which is the way a citizen can access the applications after getting the authentication. The fourth layer is the Application layer that contains both the legacy and the new system. The fifth layer is the Information / Data Store layer, which refers to the data storage. The sixth one is the Infrastructure layer. The researcher, Kaur, showed

some information about what the best technology can be used in the infrastructure layer. For example, the Apache can be a good choice as an application server because it is more accessible and more convenient. For running the servers, IBM pSeries can be a better choice, and for the DataBase, it could be a MySQL, an open source database management.

2.4 Classifications of E-government

Government provides services to different customers such as citizen, business, and government employees. Each service is different from another due to the customer's needs. There are four types of e-government as the following:

2.4.1 Government-to-Citizen (G2C)

The aim of this type is to allow the government to interact with citizens through a portal which provides all the services and information that citizens need. Before the online services, citizens took a long time to process a service because of the time, paperwork, and difficult approvals from different department. Now, G2C provides services online over 24/7 and which reduces the cost and the time to process a service. Moreover, according to Cook and other authors (Cook et al., 2002), G2C can allow citizens to be involved in democratic activities and decision-making processes.

2.4.2 Government-to-Government (G2G)

In reference (Ebrahim, 2005), for any successful e-government, it needs to integrate all the government departments and agencies to exchange information, this type should be implement it before implement the other types of

e-government because according to Ebrahim, **“**No structuring can exist without sharing, and no organisational intelligence will be created without structuring,**”** (p. 36).

2.4.3 Government-to-Business (G2B)

In reference (Forman, 2002), G2B is the service that can facilitate the communication between government and business agencies. The connection between the government and the business companies can be vital for both of them. For government, it reduces the redundancy about the business agencies. For business companies, it reduces the time and the cost to process a certain service, which can effect on the revenue, making it easier to view all the updates of the government policies and laws. Downloading application forms, getting new or renewing licenses are examples for the kind of the services that G2B can provide.

2.4.4 Government-to-Employee (G2E)

G2E provides services specifically to the employees which can help them to understand the government laws and regulations; moreover, providing this kind of service can enhance the administrative process, reduce time to complete a certain service, and decrease the number of the employees to work on a specific process (Ebrahim, 2005).

2.5 e-Readiness

Before working on the implementation of e-government projects, a government should work on the e-readiness first. This is a part of e-government strategy because it is crucial to determine if a country is ready to move from the traditional system to the electronic system. In

reference (Alshehri, 2012), Alshehri stated a definition of e-readiness that is a measurement for a country to get the benefits from the its digital economy.

In reference (Peters, 2005), e-readiness assessment is a tool that is used by a government to help make their decision about the readiness of a government for moving to an electronic system. E-readiness assessment consists of four steps which are determining the targets of the project and trying to choose a proper assessment tool, conducting the e-readiness assessment, establishing a comprehensive action plan, and implementing the plan.

Moreover, on reference (Verma, Mohan Das, & Kalra, 2005), the e-readiness assessment tools deal with one or more of the following topics:

- Physical Infrastructure: this tool covers all the telecommunications' infrastructure, such as Internet access, pricing, and bandwidth. It also includes Hardware, National and State Level Data Centers, Security Infrastructure, and Service Gateways/Payment Gateways.
- Human Capacity: this tool deals with human aspects such as literacy and ICT literacy.
- Policy Environment: it is about the laws, rules, and regulatory environment, such as trade policy, privacy policy, Intellectual Property Rights (IPR) Protection, Legal recognition of Digital Signatures, and telecommunication policy.
- ICT Usage: this deals with the usage of ICT in society, homes, and government by citizens, government, and businesses.
- Financial: this includes Financial Institutions, Financial Resources, and Budgetary Allocation.

Furthermore, there are many tools that are used for e-readiness assessment. Each one has its goals because a government needs to determine its aims before choosing a tool. In the following some of these tools that were developed by different international bodies:

2.5.1 Computer Systems Policy Project (CSPP)

In reference (Verma et al., 2005), the CSPP developed a guide which is used to determine the Networked Readiness for a country, and published in 1998. CSPP has five categories that are linked to each other. Each category has a different question as the following:

1- The network (Infrastructure): the backbone technologies that connect to the network, availability, pricing, quality of ICT, also services and equipment.

2- Networked Places (Access): where are the places to connect to the Internet and when?

3- Networked Applications and Services: this sector is about how to make the connection meaningful.

4- Networked Economy: the relation between the network and economy, and the role of the technology in driving the economy.

5- Networked World Enablers: is about the the levers expediting the Networked World.

2.5.2 Center for International Development (CID)

In reference (Sachs, n.d.), the CID guide was developed at Harvard University in 2000, this guide helps the developing countries to distinguish their networked readiness. It includes five categories which are linked to each other. Each one links to the next category, and the result will determine the readiness for the government. The categories are the following:

1- Network Access: asking about the availability, services, cost, and equipment of ICT networks

2- Network Learning: see if the ICT integrates in the educational system increase

e-literacy. Also, see if there are programs to train the citizens and prepare them for the new technology for success with the project in the future.

3- Network Society: is about how the people are using it in their lives and work?
4- Network Economy: check how government and business are using the technologies to interact with the public sector and with each other.
5- Network Policy: to see how the policy environment can support or hinder the growth or the ICT.

2.5.3 Asian Pacific Economic Cooperation (APEC)

In reference ("Hong Kong E-commerce Readiness", n.d.), the APEC and the Electronic Commerce Steering Group developed this guide. The goal of this guide is to enhance the e-commerce environment. It consists of six indicators as the following:

1- Telecommunication Infrastructure and Technology Base: this is about the speed, market competition, pricing, foreign investment, and industry standards.
2- Access and Supporting services: includes the bandwidth, credit card regulation, and experts controls.
3- Level and Type of Use of the Internet: about the number of the Internet users in business, government, and homes.
4- Awareness and Promotion: it is about the industry standards.
5- Skills and Human Resources: the government efforts to strengthen the ICT education and training.
6- Policy Positioning: it includes the legal framework, taxation, tariffs, regulation of encryption technology, and copyright protections.

2.5.4 McConnell International's Risk E-Business

In reference (Verma et al., 2005), McConnell International with a collaboration of the World Information Technology and Services Alliance (WITSA) prepare a guide of a national economy's e-readiness, it released at 2000. This model measures five areas which are:

1- Connectivity (infrastructure, access, and pricing).

2- Information Security (privacy, electronic signatures, and intellectual property).

3- Human Capital (ICT education, available skilled workforce).

4- E-leadership (government policies and regulations).

5- E-business (Competition, foreign investment, and finical infrastructure).

2.5.5 Network Readiness Index (NRI)

In reference (Verma et al., 2005), the Network Readiness Index has been developed jointly by the World Economic Forum, Infodev, and INSEAD. The goal of NRI is to understand the impact of ICT on the competitiveness of nations. The model consists of three components which are:

1- ICT environment (market, political, regulatory, and infrastructure environment).

2- Readiness of the community's key stakeholders to use the ICT.

3- The usage of ICT among the stakeholders.

2.6 E-government Benefits

Moving from the legacy system to the electronic system brings many benefits to all the stockholders, which are government, citizens, and businesses. Many researchers are using different ways to present the benefits of e-governments.

In reference (Ebrahim, 2005), Ebrahim mentioned some of the benefits for e-government which can be classified in four categories such as the following:

- **Internal:**
  - Improving the government efficiency by involving the citizens in the Democratic process and decision-making.
  - Improving the transparency of the government departments which improves the quality of data and services
  - Improving the management process to organize and decrease the complexity of the workflows for the government and business.
- **External:**
  - Increasing the response for the citizens' need and private sector.
  - Increasing the collaboration between the government and private sector (businesses).
  - Improving the transactions process over the Internet by digitising procurement and which required a better government management and collaboration with the private sector.
- **Operational:**
  - Improving the accountability of government transactions.
  - Improving the efficiency of a government by enhancing availability and accessibility to the government data and services. Government provides services 24 hours per day, 7 days per week to citizens and business clients.
  - Improving the quality of employees' work.

- Reducing time to process certain services.
- Reducing the cost of spending to process a service for citizens and businesses.

- **Technical:**
  - Improving the connection between the government bodies by sharing the data.
  - Improving the ICT for government agencies.
  - Reducing the redundancy of data and processes.

In reference (Kanaan, 2009), Kanaan classified the benefits in different perspectives, Government and Citizens, as the following:

- **Government:**
  - Improving the quality of the services.
  - Reducing the time and the money that can spend to complete a certain task. Also, improving the efficiency of the government work by providing services at anytime and anywhere, and reducing the bureaucracy.
  - Decreasing the duplication between the departments in data and applications.
  - Reducing the error rates that can be caused by the employees in the traditional way.
  - Reducing Corruption.
- **Citizens and business customers:**
  - Accessing any service 24/7.
  - Increasing their participation in the decision-making and democratic activities.
  - Increasing Transparency.
  - Decreasing the digital divide by providing places to put computers, so citizens who have no access to the Internet or do not have a computer can use the online services.

2.7 E-government Challenges

E-government project is like any other projects that face obstacles and challenges to implement it successfully. Many studies and research have been uncovering many of these barriers to avoid them during the implementation as the following:

2.7.1 Technical Issues

- ICT Infrastructure: implementing e-government can be costly because it needs advanced systems, for that the government should behave wisely and get technical expertise to upgrade the system at a low cost. Also, governments should link between the government departments to easily share the information and avoid the redundancy in data and applications, which could be difficult because some departments refuse to share their data because of privacy or political reasons (Almarabeh & AbuAli, 2010).
- Providing access to Information: government, especially the new one to the project, needs to solve the problem of converting all the paper documents into digital form, providing a huge database that needs a professional staff to manage and maintain the data.
- Providing Privacy and security: the another important point that a government needs to be concerned with is securing the citizens' information and ensuring a secure access to the data to gain the citizens' trust so they can use the services that e-government offered over the Internet. Security means providing a secure method against any unauthorized access to the data (Alshehri, 2012).

2.7.2 Social Issues

- Resistance: Citizens or government employees can hesitate to transfer to the new technology for different reasons, such as fear of losing their jobs, and mistrust of their government, or cultural reasons such as religion, beliefs, or values.
- Digital Divide: Digital Divide refers to the gap between people who have access to the Internet and people who have no access and are unable to get the benefits of the e-government services (OECD JOURNAL ON BUDGETING, 2003). This issue considers one of the challenges for the developing countries because many people still have financial problems and cannot afford a computer or Internet access .

2.7.3 Financial Issues

- Budget: implementing e-government is expensive and needs a high support from the government to implement it successfully. The spending needs are for hardware and software, training the staff, maintenance the systems and upgrade them, places, electricity, and cooling systems.

2.7.4 Resource Issues

- Staff: staff who are responsible of e-government need to have a knowledge in the field to manage and control all the equipment and the applications, otherwise it will lead to failure of the project.
- Equipment: this kind of project needs more complex equipment (Computers, Servers etc), so a government needs to upgrade its legacy system which could be expensive and consume time to implement it.

2.7.5 Organizational Issues

- Policy and regulation: the implementation of e-government needs rules, policies, and laws to control, manage, secure the online services and gain the citizen's trust with rules and laws for transaction, computer crime, and other activities (Almarabeh & AbuAli, 2010).
- Leaders Support: to bring success to the e-government project, it needs support from the top to support and encourage the implementation of the project (Hussein, Mohamed, Abdul Karim, & Ahlam, 2007). The support can be financial by providing a reasonable budget to upgrade the ICT infrastructure, or it could bring moral support by encouraging the staff to get training to manage such as a project, and to encourage people to use the services by showing their support to the project. The reason that some government leaders resist the new project is because they see it as a threat to their power or position (Sanchez, Koh, Kappelman, & Prybutok, 2003).

Chapter 3: Case Studies

There are many successful e-government projects around the world, and there are many reasons that make them successful to serve their communities and satisfy their citizens. However, using the same plan and strategy, one of these successful projects can cause a disaster to other countries. The process of copy and paste cannot work in this kind of project. In order to help Amarah to build their e-government, there should be a study to the existing successful projects that can be used as a guide in their plan phase to choose a suitable framework for Amarah. Most of the chosen countries took time to build their ICT infrastructure, increasing the awareness and increasing the rate of e-literacy, and then began the process to build their e-government.

The process of case studies in this chapter is similar to the process that had been done in (Sekkai, 2011). This chapter includes a literature review for some successful implementations of e-government according to their IT profile, e-readiness, e-government statues, and their interoperability framework. Five countries have been selected for the case study: Australia, South Korea, Bahrain, UAE, and Kuwait.

3.1 Australia

- **Country Profile**

Australia is an island continent, lying between the Indian and Pacific Oceans, and it is the world's sixth largest country. The capital is Canberra. The population at the time of March 31, 2016 was 24,261,127 people according to the Australian Bureau of Statistics (ABS). The official language for the country is English ("About Australia | australia.gov.au.," n.d.).

- **ICT Profile**

The ICT sector in Australia is considered one of the strongest sectors in the country, it increases 10% by a year ("SEEK Employment Trends: spotlight on the information and communication technology industry - SEEK Insights & Resources AU", 2016). Also, it is ranked the 4th largest in Asia-Pacific and the 11th largest in the world ("The Information Communication Technology (ICT) Sector | Exportia", n.d.). Moreover, Australia comparing with other countries, such as USA, Germany, Japan, and South Korea, has a higher percent of experts in the ICT sector (WHY AUSTRALIA BENCHMARK REPORT 2016, 2016). Because of having this strong base of ICT, Australia becomes a spot for many ICT activities of Global companies. Canon and IBM built their product development (R&D) facilities there; Cisco runs operations of advanced technical assistance centers from Australia; and Google Maps developed profitable international digital content for business from their bases in Australia ("Information Communications Technology (ICT) - Austrade's industry capability information - Austrade", n.d.).

- **E-government Readiness**

According to the UN e-government Survey for the years (*United Nations e-government survey 2012*, 2012; *United Nations e-government survey 2014*, 2014; *E-government Survey 2016 e-government in Support of Sustainable Development*, 2016) shows the e-government readiness index for Australia. From the numbers over the years, there is an enhancement in Online Service Index. For Telecommunication Infrastructure Index, there was increasing in 2014, but decreasing in 2016. The ranking of the country was moved from 12 to 2, which is high in regards to the improvement in their performance. The table below shows the readiness

index values of Australia.

Table 5
E-readiness of Australia

Measurement Component	2012	2014	2016
Online Service Index	0.8627	0.9291	0.9783
Telecommunication Infrastructure Index	0.6543	0.8041	0.7646
Human Capital Index	1.0000	0.9978	1.0000
Ranking	12	2	2

- **E-government Interoperability Framework**

  In (*Responsive Government - A New Service Agenda*, 2016), the strategy of Australia for e-government began in 2002. Since then the Australian government began putting the outlines for the e-government vision and strategy to follow their goal, known as "Better services for Better government" (p. 2). The Australian government released a document in 2004 which was Australia's Strategies Framework for the Information Economy 2004-2006. The outlines for this document contained the whole information about the government approach to providing services through the ICT.

  In reference (*Australian Public Service Information and Communications Technology Strategy 2012 - 2015*, 2012), the strategy of 2012-2015 witnessed a development in the ICT infrastructure by getting the benefits of the new technologies. Also, their goals were to facilitate the usage of the services by the citizens. The figure below shows the full strategy.

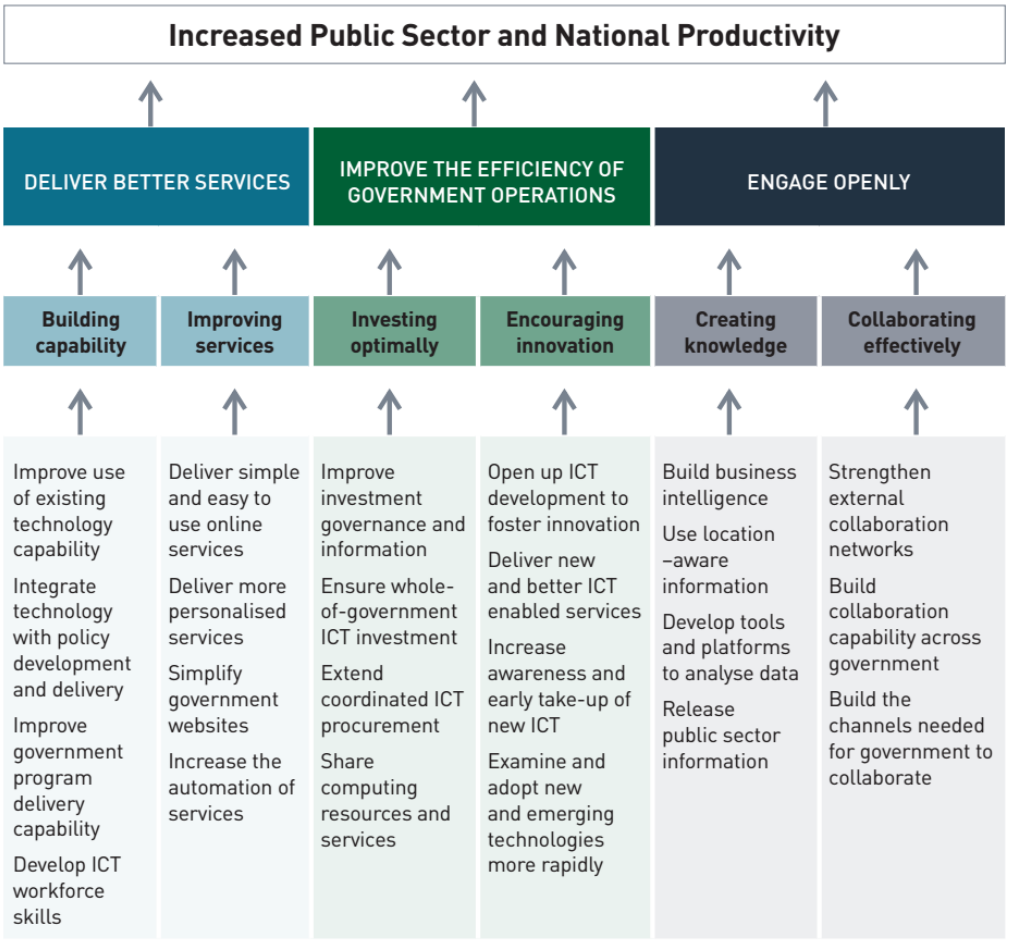

Figure 5. The Australia strategy of 2012-2015. Reprinted from *Australian Public Service Information and Communications Technology Strategy 2012 - 2015* (p. 7). 2012. Copyright Australian Government 2012. Reprinted with permission.

The Australian government made a lot of efforts to create success in the project by using the ICT that can enhance the sustainability and reduce the carbon emissions in terms of energy efficiency; the government released the Cloud Computing Strategy in 2011 which provided a better choice for saving money and time, and provided a more secure environment. Nowadays, most of the ICT infrastructure of Australia relies on the Cloud Computing (*Australian Public Service Information and Communications Technology Strategy 2012 - 2015*, 2012).

The Australian Government Architecture (AGA) is based on the Federal Enterprise Architecture (FEA) framework that was developed by the USA in 2002 (Sekkai, 2011). In reference (*e-Government Update Australian Government Architecture*, 2007), the AGA developed with the support of many cross-agency forums which are:

- The Australian Government Services Architecture Working Group (AGSAWG).
- The Chief Information Officer Committee (CIOC).
- The Business Process Interoperability Framework Reference Group (BPIFRG).
- The Business Process Transformation Committee (BPTC).

The figure below presents the architecture of the Australian interoperability framework.

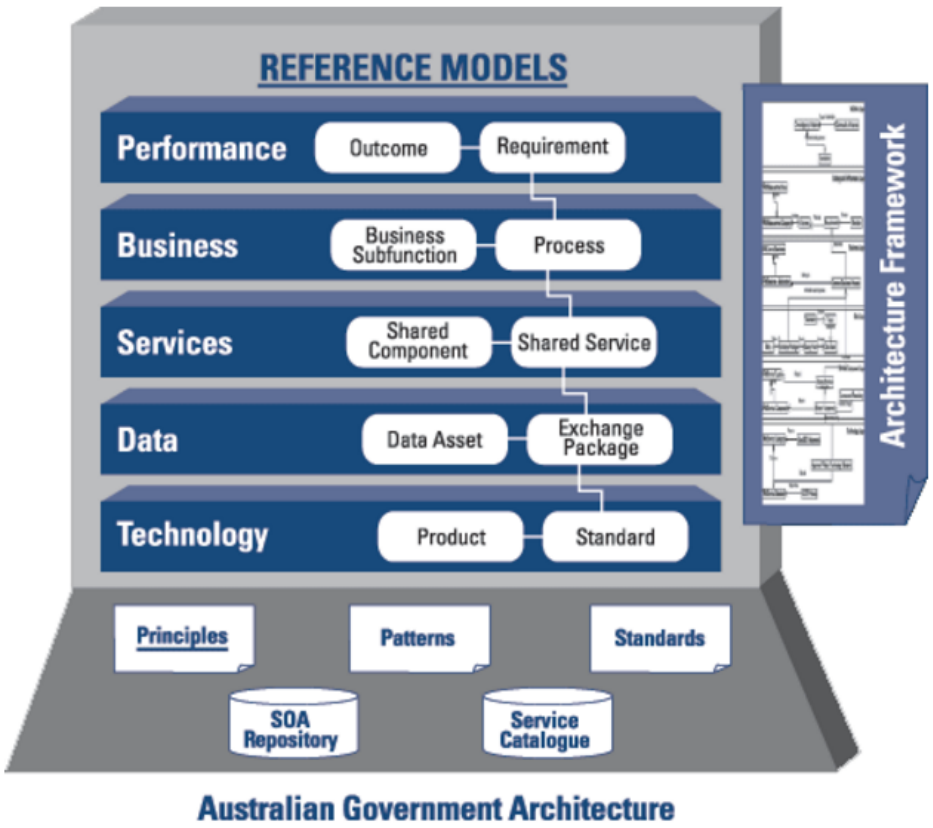

Figure 6. Australian interoperability framework. Reprinted from *Finance.gov.au*, 2015, Retrieved from http://www.finance.gov.au/policy-guides-procurement/australian-government-architecture-aga/. Copyright Act 1968. Reprinted with permission.

The architecture consists of a set of reference models that were designed to identify the duplicate investments, gaps, and opportunities for collaboration within or across agencies. The models are Performance Reference Model (PRM), Business Reference Model (BRM), Service Reference Model (SRM), Data Reference Model (DRM), and Technical Reference Model (TRM) (*Australian Government Architecture Reference Models*, 2013).

Also, the AGA contains Metamodel. The Metamodel is vital because it helps the agencies to identify the architecture components, and reinforces the alignment between the agency architecture and the AGA Reference Models (*Australian Government Architecture Reference Models How to Use Guide Version 1.0*, n.d.).

The architecture principles are considered as a guide for agencies to establish policies between the agencies, and provide a basis for architectural decision-making. Patterns and standards are to support the re-usability of the proven designs. SOA repository and service catalogue are to help agencies in their discovering for sharing and re-use (*e-Government Update Australian Government Architecture*, 2007).

3.2 South Korea

- **Country Profile**

South Korea is bordering North Korea in the south, separated from China and Japan by the Sea of Japan, Yellow Sea and Korea Strait. The capital is Seoul. The population on November 6, 2016 was 50,577,734, based on the latest United Nations estimates. The official language of the country is the Korean language.

- **ICT Profile**

According to the International Telecommunication Union (ITU), South Korea ranks the top in the global list ranking countries on the level of ICT access, skills, and use (Phneah, 2012)**.** South Korea has the fastest Internet connection, which is 29.0 Mbps with the cheapest price compared with other countries ("South Korea boasts world's fastest internet speed", 2016).

Moreover, South Korea is the first country that used FTTH/B (Fiber to The House / Building) connection in houses, which lead to providing the high speed Internet connection. The encouragement from the Korean government makes the country on the top. South Korea began building their ICT infrastructure from mid-1990. The following are some of what the government did to enhance the ICT sector. In 1999 the government established the Korean Information Infrastructure (KII) to improve the country's IT infrastructure; the government established Framework Act on Infrastructure Promotion to enhance the quality of life of the community; and established Cyber Korea 21 to accelerate the development in the IT sector (Vesikula, 2013).

- **E-government Readiness**

According to the UN e-government Survey for the years (*United Nations e-government survey 2012,* 2012; *United Nations e-government survey 2014*, 2014; *E-government Survey 2016 e-government in Support of Sustainable Development,* 2016) which presented the e-government readiness indexes for South Korea. From the numbers of all the years, there is a decrease in the Online Service Index. The Telecommunication Infrastructure Index increased in 2014, but decreased in 2016. In Human Capital Index, it decreased since 2012. All the

decreases in the index values caused the falling from the first place into third place in 2016. The Humane Capital Index decreased because there were decreases in the college entrance rates, since people have changed their thoughts about college and employment. They think that their careers should be based on their interests and experiences only ("South Korea Misses First Place in UN e-Government Rankings", 2016). The table below shows the readiness index values for South Korea.

Table 6
E-readiness of South Korea

Measurement Component	2012	2014	2016
Online Service Index	1.0000	0.9764	0.9420
Telecommunication Infrastructure Index	0.8356	0.9350	0.8530
Human Capital Index	0.9494	0.9273	0.8795
Ranking	1	1	3

- **E-government Interoperability Framework**

  In reference (Almunawar, Low, & Rahman, 2012), the development of ICT sector in South Korea began since the early 1980s, and even when there was an economic crisis in 1997, the country kept investment in the ICT sector and improved government digitization. This was related to strong Korean leadership, determination and will to improve their country. They took careful steps and good strategies for the country's future. For that, the Korean government took time to establish e-government projects, and which can be divided into five periods:

1. 1993-1997 during the Young-Sam's administration: in this period, there were strategies for developing the infrastructure. System automation and the creation of a legal framework for national informatization were some of the innovations that were done in this period.
2. 1998-2002 during the Kim Dae-Jung's administration: it is the improvement infrastructure period. The goal was to create ICT broadband network and Internet. Examples for some innovations that were done in this period include providing high speed internet and overcoming the financial crisis of the 1997 by improving the ICT industry. Also, there were eleven e-government initiatives established during the Dae-Jung's administration. The figure below shows the projects that have been established in the Kim's period.

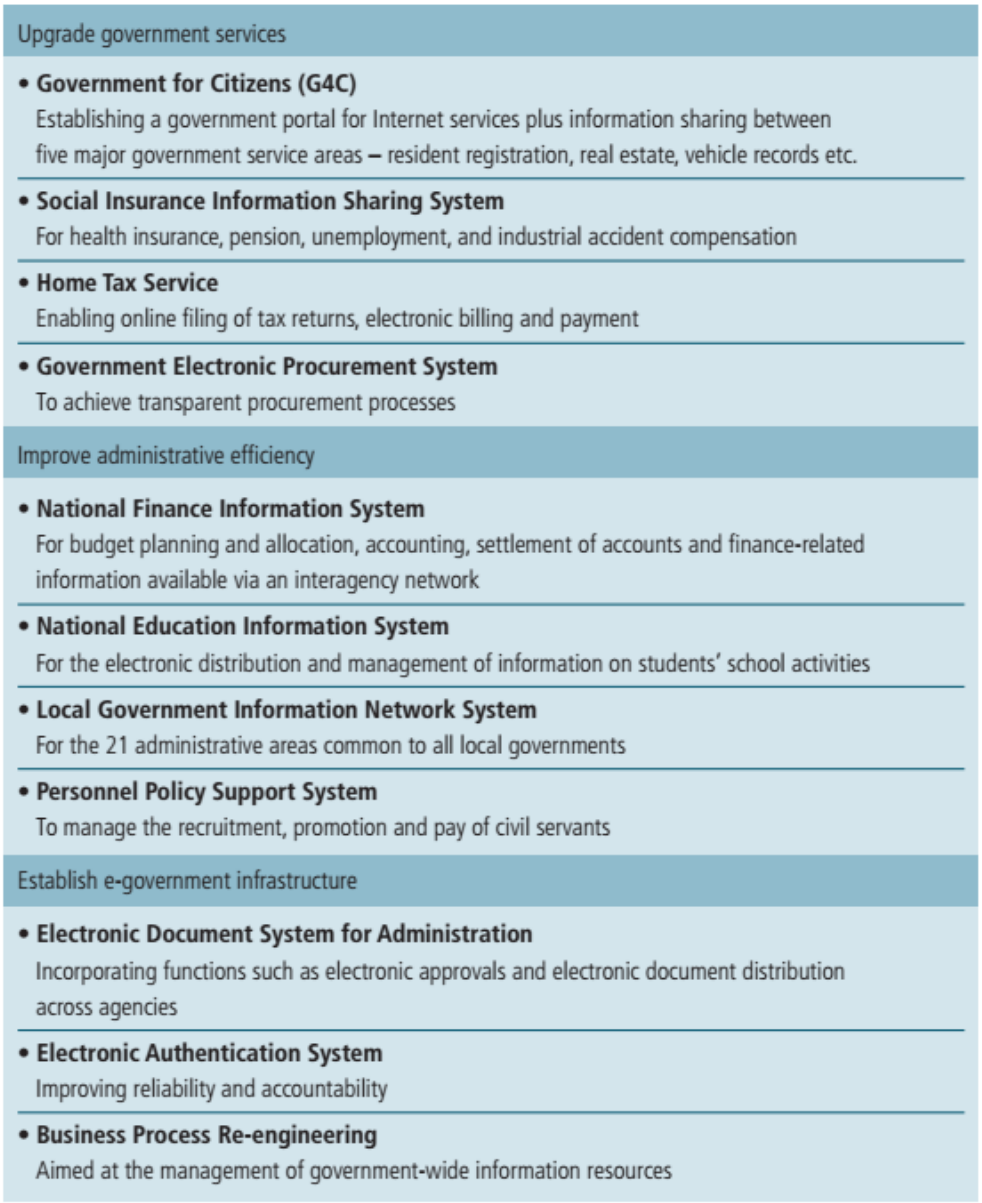

Figure 7. E-Government in Kim administration. Reprinted from *Connected government: thought leaders; essays from innovators* (p. 26), by W. Kaczorowski, 2004, London: Premium Publ. Copyright 2004 Premium Publishing. Reprinted with permission.

3. 2003-2007 during the Roh Moo-Hyun's administration: the aim of this period was to expand the e-government services by digitization all the government business processes. In Roh Moo-Hyun's time, the rank of the country moved from 15 to 6 (Chung, n.d.). Also, in this period, the e-government projects extended from 11 to 31 initiatives.

Table 2 31 E-Government Roadmap Tasks and Responsible Agency

Goals	Agenda	Tasks	Sub-tasks	Ministry in charge
Innovating the Way Government Works	Establishing e-Working Process	1. Digitalizing Document Processing Procedures	1-1. E-Document Exchange Enhancement Project	MOGAHA
			1-2. Archive Management	NARS
			1-3. Digitalizing Document Register	MOGAHA
		2. Comprehensive Informatization of National and Local Public Finance	2-1. Informatizing Local Public Finance	MOGAHA
			2-2. Enhancing the National Finance Information System	MOFE
		3. Realizing Local E-Government	3-1. Informatizing City/Province Administration	MOGAHA
			3-2. Enhancing Public Administration Information System of Town/County/District	MOGAHA
		4. Building e- Auditing System		BAI
		5. Realizing e-National Assembly	5-1. Building the National Assembly Legislation Participation Portal	NAS
			5-2. Expanding Infrastructure for National Assembly Integrated Security Control	
		6. Building Integrated Criminal Justice Service System		SPO
		7. Comprehensive Informatization of HR Management	7-1. Building HR Information System for Local Governments	MOGAHA
			7-2. Enhancing the Personnel Policy Support System	CSC
		8. e-Diplomacy System		MOFAT
		9. Real-time Management of National Agenda		MOGAHA
	Expanding Sharing of Administrative Information	10. Expanding of Administrative Information Sharing	10-1. Expanding Administrative Information Sharing	MOGAHA
			10-2. Establishing Nationwide Implementation Strategy for Information Sharing	MOGAHA
			10-3. Promoting Knowledge Management in Public Institutions	MOGAHA
	Service-oriented BPR	11. Developing Government Business Reference Model		MOGAHA
Innovating Civil Services	Enhancing Civil Service	12. Enhancing Internet-based Civil Services		MOGAHA
		13. Integrated National Disaster Management Service		NEMA
		14. Advanced Architectural Administration Information System	14-1. Enhancing Architecture Administration Information	MOCT
			14-2. Connecting and Managing Real Estate Information	MOGAHA, MOCT
			14-3. Reorganizing Architecture Register	MOCT
		15. Integrated Tax Service		NTA
		16. Integrated National Welfare Service		MOHW
		17. Comprehensive Food and drug Information Service	17-1. Food and Drug Safety Management Service	KFDA
			17-2. Agricultural, Animal and Marine Product Safety Management Service	MAF, MOMAF
		18. Comprehensive Employment Information Service		MOLAB
		19. Internet-based Administrative Judgement Service		MOLEG
	Enhancing Business Support Services	20. Single-Window for Business Support Services (G4B)		MOCIE
		21. Integrated National Logistics Information Service		MOMAF,KCS
		22. E-Commerce Service		MOCIE
		23. Comprehensive Foreigner Support Service		MOCIE, etc.
		24. Support for Exporting E-Government Solutions		MIC
	Increasing Electronic Citizen Engagement	25. Increasing Online Citizen Participation	25-1. Increasing Online Citizen Engagement	MOGAHA
			25-2. Revitalizing Use of E-Government Services	
			25-3. Expanding Online Administrative Information Disclosure	
			25-4. e-Voting and e-Election	NEC
Innovating Information Resource Management	Comprehensive Standardization of Information Resource	26. Building a Government-wide NCIA		MIC
		27. Strengthening E-Government Communications Network(e-GOV Net)		MIC
		28. Establishing Government-wide ITA		MIC
	Strengthening Information Security System	29. Building Information Security System		NIS, etc.
	Strengthening Information Organizations and Personnel	30. Restructuring Informatization Organizations and Personnel		MOGAHA
Reforming the Legal System	Restructuring E-Gov Legislation	31. Reforming the Legal System for E-Government and Security		PCGID
Total	10 Agenda	31 Tasks and 45 Sub-tasks		

Figure 8. The 31 initiatives in Roh Moo-Hyun's administration. Reprinted from *2005 Annual Report for E-Government* (p. 14), by Y. K. Oh, 2005, Ministry of Government Administration and Home Affairs(MOGAHA). Reprinted with permission.

4. 2008-2012 during the Lim Myung-Bak's administration: more improvement has been done on e-government project in this period. The target was the integration of all the e-government systems. For that, there were some actions that were done to ensure the seamless delivery of the e-government services, such as enhancement of the public participation, Intelligent administrative services, real-time public safety information network, and improvement of privacy and security.
5. From 2013 to the present during the Park Geun-Hye's administration: in this period, the Korean e-government was on the top according to the UN survey of 2012. However, the government agenda had a plan to enhance the performance of e-government and revitalize the economy. Also, the priority was to implement Government 3.0 (*WHY AUSTRALIA BENCHMARK REPORT 2016*, 2016).

According to Sekkai (2011), "The interoperability framework adopted by Korea is a combination of Federal Enterprise Architecture (FEA) and e-Government Interoperability Framework (e-GIF), the Korean government wanted through this fusion to create a hybrid model that will ensure simultaneously the organizational interoperability and the technical interoperability, " (p. 50).

The Koreans used the FEA framework that was initialized by the US government to establish their e-government interoperability framework. In reference (Nam, Oh, Kim, Goo, & Khan, 2016), there were three stages to implement the EA for the South of Korea as the following:

1. Preparation (2003 - June 2006):

The goal of this stage was to establish laws and guidelines to provide the basis for EA framework implementation, and to implement four pilot projects. Also, the EA was one of the 31 e-government projects. Moreover, the aims of this stage from the technical aspects were to secure the interoperability. The components of the EA frameworks were meta model, reference model, and maturity model. The figure below presents the South Korea EA framework and its components.

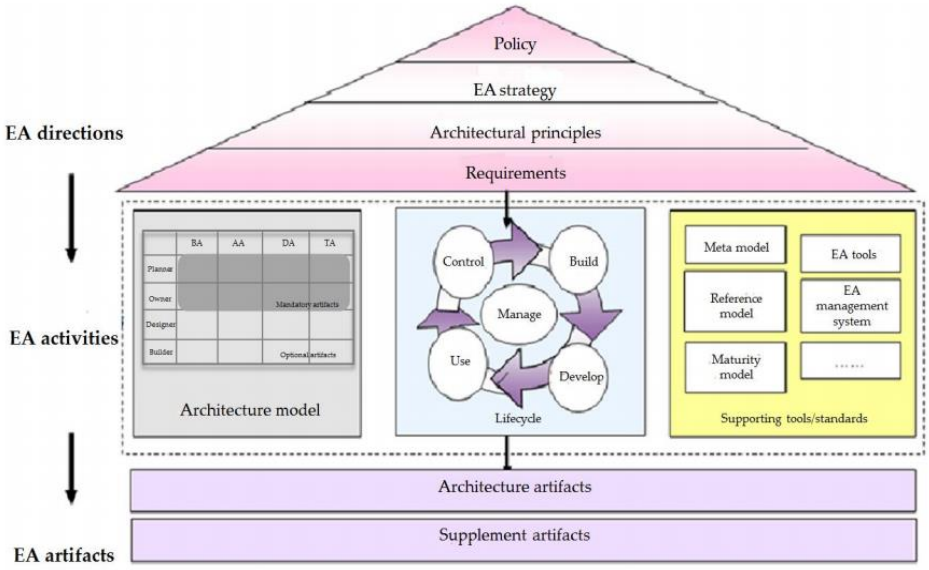

Figure 9. South Korea EA framework and its components. Reprinted from "Dynamics of Enterprise Architecture in the Korean Public Sector: Transformational Change vs. Transactional Change," by K. Nam, 2016, Sustainability. Copyright 2016 by the authors. Reprinted with permission.

In this project, there were three agencies who worked together to implement e-government projects successfully. The primary agency was the Ministry of Information and Communication (MIC), the supporting agency was the Ministry of Government Administration and Home Affairs (MOGAHA), and the execution agency was the National Information society Agency (NIA).

2. Foundation (July 2006 - May 2009):

In this stage, other required laws and guidelines for EA implementation were established, such as laws and guidelines to implement and operate of IS for the agencies that would adopt the EA framework. For that, each agency had to follow a meta model guideline for EA. The National Information society Agency (NIA) provided a Government IT Architecture Management System (GITAMS), which was a standard for EA management systems that were adopted by all the agencies, such as Korean Postal Service and Ministry of Land, and Transport and Maritime Affairs. These agencies were the best to deal with the duplication system issues. The results from this stage were adoption of the EA framework from many agencies, and completion of the laws and guidelines for the EA.

3. Utilization (2009 - Present):

In this stage, all the laws and guidelines of EA were integrated into the Electronic Government Act to work as a legal framework for e-government laws and regulations. Also, the role of the agencies, NIA and MOGAHA, changed for management only at a Government-Wide level because in this stage the individual agencies were able to manage and control their deliverable. The NIA became an agency that can provide a professional knowledge for implementation. There is no role of MIC in the government, and for MOGAHA it became a responsible agency. Moreover, the goal of this stage was to improve the role of EA, which was to integrate the management of IT resources to non-duplication of IT resources.

3.3 Bahrain

- **Country Profile**

Bahrain or the Kingdom of Bahrain consists of 33 islands that are located in the Arabian Gulf between Qatar and the Saudi Arabia. The capital is Manama. The population on November 13, 2016 was 1,404,233 according to the latest United Nation estimates. The official language for the country is Arabic.

- **ICT Profile**

Bahrain is different from any other country in the MENA region, especially in the ICT sector. Bahrain was the first country in the MENA region that installed a mainframe computer in 1962. In 2013, Bahrain Launched the 4G network which speeds download up to 100 Mbps. Moreover, Bahrain provides Internet service for low prices because of having satellite links and undersea cables. Also, Bahrain was ranked in the top thirty countries for five years consecutively, and for the number of Internet users was in the tenth place. All these developments in the ICT sector and for other features that Bahrain provides, such as no taxation, no free zone restriction, low cost of living and operation, and 100% of foreign ownership, encourage the most important companies in the world to choose Bahrain as the base for their business in the country, such as Cisco, Microsoft, and Huawei (*ICT 2015 - Economic Development Board*, 2015).

- **E-government Readiness**

According to the UN e-government Survey for the years (*United Nations e-government survey 2012,* 2012; *United Nations e-government survey 2014*, 2014; *E-government Survey 2016*

e-government in Support of Sustainable Development, 2016), table 7 shows the e-government readiness index values for the Kingdom of Bahrain. There is a noticeable increase in the Telecommunication Infrastructure Index. However, the other indexes dropped down which affected its rank. Especially after a great level in 2014, the rank moved from 18 to 24 in 2016. The Information & eGovernment Authority CE Mr. Mohammed Ali AlQaed stated that one of the reasons was, "the standards that have been added to this report's edition comprising the measurement of Smart Cities which require massive budgets for their establishments," ("Kingdom of Bahrain - eGovernment Portal", 2016).

Table 7
E-readiness of Bahrain

Measurement Component	**2012**	**2014**	**2016**
Online Service Index	0.8627	0.9370	0.8261
Telecommunication Infrastructure Index	0.4183	0.7055	0.7762
Human Capital Index	0.8028	0.7840	0.7178
Ranking	36	18	24

- **E-government Interoperability Framework**

  In reference (*Bahrain eGovernment Best Practices*, 2014)**,** the e-government project began in 2007 by establishing the eGA (eGovernment Authority), which was responsible to implement the e-government strategies. Also, Bahrain established the Supreme Committee for Information and Communication Technology (SCICT) and Technical Committee for Information and Communication Technology (TCICT) to provide guidelines to implement and develop the e-government project.

There were two strategies for Bahrain which are:

- The first strategy (2007-2010)

In reference (*eGovernment Strategy Summary 2007 - 2010*, 2007), the goal in this strategy was to provide services to all the customers which could be citizens, residents, or businesses. There were two concepts for this strategy:

1. Customers have choices and demand services

   Customers have different needs and types of services that the government can provide. Also, some of the expectations of the customers from the online services are quality, availability, and the time to process a service. For that, the government should provide what the customers want and not what the government desires, so the e-government can serve its goals. One of them is to facilitate the customer's processes in government agencies.

2. They demand value for money

   From the customer's perspective, they have no need to pay for a certain service that is part of the government responsibilities. The customers can pay, in return the government should increase the effectiveness of the services. Also, government needs to reach the aim of the e-government project by providing services with low cost.

- The second strategy (2011-2016)

In reference (Ahmed, 2013), the objective of this strategy was increasing the customer's participation, increasing the private ICT sector readiness, providing higher performance

and efficient government, providing protection for the customer's information, providing smart phone apps and increasing the customer's awareness, improving the e-literacy and IT skills for employees, and improving the customer's experience and e-government channels.

In 2010, the e-Government Authority (eGA) of Bahrain established the National Enterprise Architecture Framework (NEAF) which consists of models, Meta-model, technology standards, governance, and guidelines to support, develop, deploy, and be as a guide to design and implement EA in other agencies across the Kingdom of Bahrain. One of its dynamic features says that any change in the future can be done smoothly without any complexity (AlSoufi, 2014).

In 2013, the eGA declared that there would be radical changes in the e-government portal (Bahrain.bh), provide training for almost 4300 citizens to deal with computers and the new e-government portal, and provide training for 132 government employees. Moreover, eGA established seven training centers across the Kingdom to increase the literacy in IT, and to increase the citizens' awareness in the e-government ("Bahrain's E-Government's new format 2013 launched", 2012).

3.4 United Arab Emirates (UAE)

- **Country Profile**

UAE borders from the East with Oman, the South with Saudi Arabia, the North with Iran, and maritime border with Qatar. UAE has seven emirates which are Abu Dhabi, Ajman, Dubai, Fujairah, Ras al-Khaimah, Sharjah and Umm al-Quwain. The capital is Abu Dhabi. According to the latest United Nations estimates, the population of Emirates is 9,308,861. The official language for the country is Arabic ("United Arab Emirates", n.d.).

- **ICT Profile**

The ICT sector in UAE considers the best in the MENA region, and in the Network Readiness Index in 2016, UAE ranked first among Arab states and 26th worldwide (Baller, Dutta, & Lanvin, 2016).

In reference (*NATIONAL PROFILE OF THE INFORMATION SOCIETY IN THE UNITED ARAB EMIRATES*, 2007), the government established Telecommunications Regulatory Authority (TRA) in 2003. The goals to establish TRA are some of the following:

- Making sure that the telecommunication services are available all over the UAE.
- Improving the services (the quality).
- Increasing awareness about the IT services.
- Promoting interaction with the telecommunications by providing training.
- Solving any conflicts between the licensed operators.
- Implementing a regulatory and policy framework.

Also, in 2010, TRA launched the first non-English domain in the Arab world, which is pronounced as (dot emarat). The UAE has two fixed networks and mobile operators, which are Etisalat and Emirates Integrated Telecommunications Company that branded as “du”. In 2011, Etisalat had the 16th largest number of mobile operators in the world.Also, it has business outside the UAE in places such as Iran, Egypt, Saudi Arabia, Sudan, India, and Indonesia. Also, it provides Internet services to users, such as 3G Mobile Internet access and broadband internet services ("Telecommunication in the united arab emirates", 2013).

- **E-government Readiness**

According to the UN e-government Survey for the years (*United Nations e-government survey 2012,* 2012; *United Nations e-government survey 2014,* 2014; *E-government Survey 2016 e-government in Support of Sustainable Development,* 2016), table 8 shows the e-government readiness index for the UAE. From the numbers over the years, there is an enhancement in Online Service Index and Telecommunication Infrastructure Index since 2012.

The rank of the country dropped from 28 to 32 in 2014 because according to Mr Kerby, senior inter-regional adviser on eGovernment services to the UN Department of Economic and Social Affairs (Carroll, 2014), there are no problems with the UAE’s e-government and its services, but the reason is other countries enhanced the performance of their e-government.

Table 8
E-readiness of The UAE

Measurement Component	2012	2014	2016
Online Service Index	0.8627	0.8819	0.8913
Telecommunication Infrastructure Index	0.5568	0.5932	0.6881
Human Capital Index	0.7837	0.6657	0.6752
Ranking	28	32	29

- **E-government Interoperability Framework**

In 1997, His Highness Sheikh Hamdan Bin Rashid Al Maktom suggested to begin working on the e-government project (*NATIONAL PROFILE OF THE INFORMATION SOCIETY IN THE UNITED ARAB EMIRATES*, 2007). The first initiative, eDirham, began in 2001 at the federal level; the purpose was to collect fees for the government services. Now, the UAE e-government is considered one of the best implementation of e-government, especially in the MENA region ("EGovernment - uaepedia", 2016).

In reference (Al-Khouri, 2012), the methodology to implement 2012-2014 strategy consisted of seven components and seven benchmarks as in figure 10 Which are:

Figure 10. The development methodology of the UAE e-government. Reprinted from "eGovernment Strategies the Case of the United Arab Emirates (UAE)", by A. Al-Khouri, 2012, *European Journal Of Epractice*, 17. p. 12. Reprinted by permission.

- The benchmarks: which contained some of the best implementation of e-government around the world in places like Canada, USA, South Korea, EU, Singapore, and the Gulf Cooperation Council (GCC).
- Vision and Mission: the 2012-2014 strategy was developed by TRA. The aim for this strategy was to cooperate between federal e-government and federal government agencies to create a basis for the UAE vision 2021, which will make the UAE one of the best countries by 2021.
    - Strategic Intents and Dimensions: the UAE relied on a framework that consisted of the three dimensions of the environment, readiness, and usage. The environment dimension deals with the infrastructure and policies that can effect on the ICT

growth in the country. The readiness dimension which measures the readiness of the country to deal with the project can help the federal agencies to improve the governance, and build a solid infrastructure. The usage dimension is about federal agencies providing services to different customers (citizens, employees, and business) through different channels. In 2009, the first two dimensions (environment and readiness) were completed, after that the focus was to work on the usage dimension. At the same time, there were some changes and updates on the environment and readiness dimensions to implement the e-government vision.

- Strategic Goals and Objectives, and Work Themes Performance Indicators: there were five strategic objectives of e-government after the development in vision and mission, and four work themes and performance indicators, as shown in figure 11.

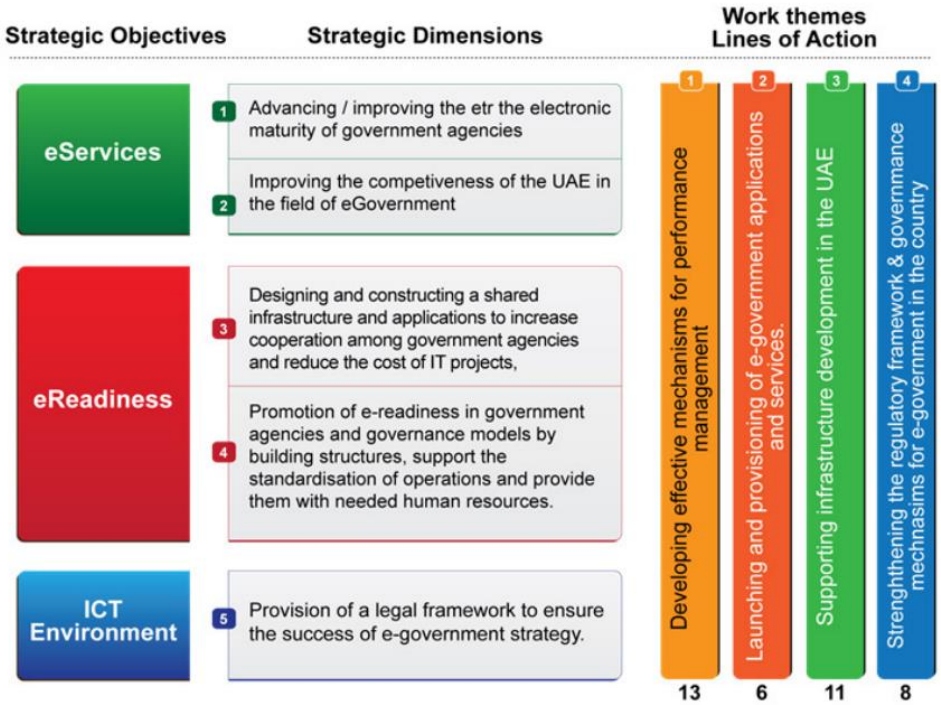

Figure 11. The strategic, goals, and work themes. Reprinted from "eGovernment Strategies the Case of the United Arab Emirates (UAE)", by A. Al-Khouri, 2012, *European Journal Of Epractice*, 17. p. 14. Reprinted by permission.

- Initiatives: to achieve the goals of this strategy, the UAE government had to implement 38 initiatives as shown in the figure below.

Figure 12. The initiatives of the UAE e-government. Reprinted from "eGovernment Strategies the Case of the United Arab Emirates (UAE)", by A. Al-Khouri, 2012, *European Journal Of Epractice*, 17. p. 16. Reprinted by permission.

- Schedule and Budget: the schedule referred to the time that needed to implement all the initiatives, and the budget contained all the cost to implement the initiatives.

3.5 Kuwait

- **Country Profile**

Kuwait is a country that is located in Western Asia, and it is bordered with the three countries of Iraq, Iran, and Saudi Arabia. The capital is Kuwait City. The population in 2016 is 4,049,899 people according to the latest United Nations estimates. The official language for the country is Arabic ("Kuwait", n.d.).

- **ICT Profile**

In 1980s, Kuwait was the first country in the region that established the Mobile Telecommunication Company, known now as Zain. Also, the first that adopted Internet. However, in the last years, Kuwait dropped far behind other countries in the region like Bahrain and UAE because of the lack of independent regulatory body. In 20ll, Kuwait increased their spending on the ICT sector, hopefully to be in the same level with the other GCC ("Markaz", 2013).

In reference (*Consolidated Kuwait National ICT Indicators Report 2016*, 2016), Kuwait has fixed networks that cover the whole country. In 2016, the estimate of having fiber connections is about 130,000 and can grow more than 200,000 in 2019. For mobile cellular subscription

accounts to 8,719,000 - a 240% penetration among the country population, there are three mobile operators which are Zain, VIVA, and Ooredoo. The mobile network covers 100% of the land area and population, and 97% for the 4G LTE network. The ITE network in Kuwait are considered the 4th highest in the world after South Korea, Japan, and Hong Kong. The figure below shows that Kuwait is the first in GCC for the mobile penetration.

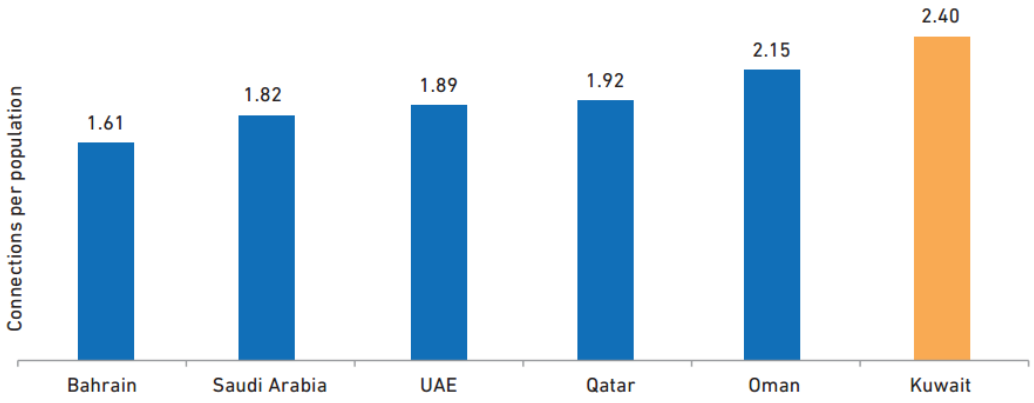

Figure 13. Mobile penetration in GCC. Reprinted from "Consolidated Kuwait National ICT Indicators Report 2016", 2016. p. 24. Reprinted by permission.

Moreover, the reason that Kuwait has the advanced ICT sector is because of having an ICT manpower. Sixty percent of the ICT manpower are professional expatriates, and most of them have certifications from Cisco, Microsoft, Oracle, and other ICT certifications and training (*Consolidated Kuwait National ICT Indicators Report 2016*, 2016).

- **E-government Readiness**

According to the UN e-government Survey for the years (*United Nations e-government survey 2012*, 2012; *United Nations e-government survey 2014*, 2014; *E-government Survey 2016 e-government in Support of Sustainable Development*, 2016), table 9 shows the e-government readiness index for Kuwait. From the numbers over the years, there is an enhancement in

Online Service Index. For Telecommunication Infrastructure Index, there was improvement since 2012. The ranking of the country improved, especially in 2012. It moved from 63 to 49 in 2014.

Table 9
E-readiness of Kuwait

Measurement Component	2012	2014	2016
Online Service Index	0.5817	0.5748	0.6522
Telecommunication Infrastructure Index	0.4179	0.5862	0.7430
Human Capital Index	0.7885	0.7194	0.7287
Ranking	63	49	40

- **E-government Interoperability Framework**

In reference (AlAwadhi, 2007), the interesting e-government project began in late 1990s when the Emir of Kuwait, Sheikh Sabah Al-Ahmad Al-Sabah, gave his orders to determine the e-readiness of the country. After that, the e-government project was one of the top priorities in the country. In 2000, the National Higher Committee established the Central Technical Body (CTB). The aims of establishing the CTB were to organize the work between organisations and the National Higher Committee, and to be responsible for determining the IT specialists for creation of a suitable framework for the e-government project. CTB consists of five teams working together as the following:

1. Secretariat Team: the responsibility of this team is to prepare, document, distribute, and organize the other team's work.
2. Technical Team: the responsibility of this team is to monitor the standards and modules that proposed and implemented by the Higher National Committee. Also,

to monitor the achievements of the project and to offer advice from the technical perspective to increase the performance.

3. Awareness and Information Team: the responsibility of the team is to supervise the information and the marketing plan that the Higher National Committee signed and approved. Also, to suggest and to perform research on the results and effect of using the digital services.
4. Legislative Team: the responsibility of this team is to create new laws and to modify the existing laws that are related to e-government project.
5. Changes and Process Engineering Management Team: the responsibility of this team is to organize the decisions that were offered by the Higher National Committee and then to change them to fit the e-government.

The Kuwait government thought that the best way to put an appropriate strategy to implement e-government project was by cooperating with the people who have experiences in e-government field. For that, in 2004, there was an agreement signed between Kuwait and Singapore called a Memorandum of Understanding (MOU). With the Memorandum, Singapore helped Kuwait to establish the Central Agency for Information Technology (CAIT), and support the Kuwaitis to develop their e-government (Abdelhafez & Amer, 2016). In 2005, another MOU signed and the result of that cooperation, establishing two e-government projects (Kuwait Information Network and Kuwait Government Online) ("Singapore and Kuwait Strengthen Co-operation in e-Government - Infocomm Media Development Authority", 2016).

Chapter 4: Suggestion process and framework to implement e-government project

The coping strategy of other countries' frameworks is not a strategy that should be followed by any country, especially Iraq because its situation is different from the others. Also, each city in Iraq has its cultural, political, economic, and social differences. One of the reasons of failing projects in Iraq is following the other steps to implement or process any project without a reasonable study to all the factors. Amarah, the southern city in Iraq is working on a strategy to implement its e-government. This thesis can help Amarah to point out some of the challenges. Also, it can highlight some of the successful e-government implementations, and suggest a framework to help the city council during their process to implement the project.

4.1 The PEST Analysis and Case Studies Analysis

PEST analysis is a tool that is used by an organization to distinguish factors such as Politic, Economy, Social, and Technological, that can affect implementing a project (*PESTLE Analysis*, 2013). Since 2003, Iraq witnessed many changes that are related to politics, education, technology, social, and culture. Moreover, the situation from the north to the south is not stable, each province has its issues that affects the economy, society, culture, and technology. Also, to implement a project such as an e-government, Amarah needs to work with the government in Baghdad to get all the permissions to start working on the project. For that, the Council of the city should provide a study that covers all the elements that can bring success or failure to the project. PEST analysis can be a better choice to start with to

understand the current situation for the city and the factors that can influence implementation. By the result of this analysis, the Council will know the issues that can slow or fail the project.

In reference ("PEST Analysis: Identifying Big Picture Opportunities and Threats", n.d.), PEST has different variations that include other factors besides Politics, Economy, Social, and Technological factors, which are as the following:

- PESTLE: includes Legal and Environment.
- PESTLIED: includes Legal, International, Environment, and Demographic.
- STEEPLE: refers to Social, Technological, Economic, Environmental, Political, Legal, and Ethical.
- SLEPT: refers to Social, Legal, Economic, Political, and Technological.
- LONGPESTLE: refers to Local, National, and Global version of PESTLE.

4.1.1 Political Factor

The biggest factor that affects the others is the political factor because the stability of the country can enhance and push the country to improve its infrastructure in different areas. Each province in Iraq is trying to be independent and to improve its infrastructure. However, these cities should go back to the Central power, Baghdad, to get the permission and funding. Some of the political factors that the city can face them are:

- The country is still not stable, there are many conflicts between different parties in Iraq. Also, the war against terrorism, such as ISIS, is continuous. Terrorism and the fight between the parties can slow the development of the country. For that, the Council needs to take all the required permissions from the current government, and

begin real work to implement it.

- The Council needs to provide security to their buildings, especially ones that manage and control the project. Also, the Council should provide a secure environment to all the facilities to reduce the terrorist attacks that can destroy all the infrastructure and force beginning anew. Moreover, they need to create a law and regulations for cybercrime.
- The corruption is an issue that is difficult to terminate now with the current situation.
- The willingness of the leadership can change and stop supporting the project. Also, the conflict between the parties can slow and stop its process.
- The political realm can be involved in the technical process by choosing people depending on their political views, not on their experiences in ICT field.

For most case studies in Chapter 3 of this thesis, all the countries are different from Iraq during their implementation of e-government. They received support from their leadership, and had no war or terrorism attacks. So, it is not wise to follow their exact strategies. However, South Korea can be a good example for how the government can be strong and support the project which it is one of the reasons that South Korea remains on the top. Since 1993 until 2013, there were five administrations, and each one continued the previous plans to develop and enhance the infrastructure of the country. For the MENA region, UAE can be the best country in the region that is looking for a future. One of its plan is implementing a best e-government because the vision of their leader, His Highness Sheikh Hamdan Bin Rashid Al Maktom.

4.1.2 Economy Factor

According to World Bank ("Iraq Overview", 2016), Iraqi economy suffers from many crisis, such as the declining in the oil pricing since 2015, and the still existence of ISIS. For that, and according to the current situation, Amarah could have problems with the funding because the country is at war with ISIS and hopes to decrease their existence in the country or terminate them entirely. Moreover, there are other challenges that can be introduced, such as the following:

- Increasing in poverty: poverty is a reason for the failure of the e-government project because the expenses of the connection to the Internet and owning of a computer.
- Increasing of unemployment: the government plans to improve the economy is by decreasing the employment and the employees' salaries.
- Lack of skills because of poor salaries makes many look for jobs out of the country. Also, the available staff lack in knowledge and need training.
- E-government project is not in the priorities of the government plan.
- Corruption in the system by making fake agreements, or poor agreements that can fail the project.
- Poor private investments in the country due to security issues and corruption.
- After 2003, most of the facilities in the country were damaged.

All the disagreements between the parties in Iraq caused economic problems because there is no plan to help the country over its crisis. Most of their plans produced more issues, such as the decreasing the salaries of the employees which declined the production. Also, depending

on oil is the worst plan with all the continuous decreasing in oil prices. There are many other resources that can help to increase the economy, such as tourism. Iraq has many holy Islamic cities to consider, such as bdul-Qadir Gilani's Shrine in Baghdad, Imam Ali A.S. Holy Shrine Imam Ali Mosque in Najaf with remains of Adam and Noah According to Shi'a belief, Imam Ali al-Hadi and Imam Hasan al-Askari A.S. Holy Shrine Al-Askari Shrine in Samarra, Talhah & Zubayr ibn al-Awam Shrines in Basra, Zayd ibn Ali Shrine in Babel, Hud (prophet) & Saleh in Wadi-us-Salaam Cemetery in Najaf, Dhul-Kifl sanctuary in Hilla, Jonah & Seth sanctuary in Mousel, and Uzair sanctuary in Amarah. Also, Iraq has five World Heritage Sites recognized by the UNESCO, which are Ashur (Qal'at Sherqat), Erbil Citadel, Hatra, Samarra Archaeological City, and The Ahwar of Southern Iraq. Moreover, other historical cities exist such as Babylon, Ur of the Chaldees, and Ctesiphon. All these places can attract many tourists and could help the country to overcome the crisis. However, at the beginning, the government should provide a secure environment to encourage people to come and visit Iraq.

In the case studies many countries avoided many crises that faced their country because the wise and the will of their leaders. As an example, South Korea survived the economic crisis of 1997 by keeping investment in the ICT sector. Also, UAE leaders and their visions and plans did not depend on oil. Instead, they and found other ways to enhance the country’s economics. UAE is on the top of tourists’ list to the Middle East.

4.1.3 Social Factor

All the factors that mentioned in the previous factors (Politics and Economics) have a direct and indirect influence on the social life in Iraq, especially in the southern cities. The following are some of the social issues:

- Education: overall, Iraq before 2003 was in the top list of having the best education in the Middle East. The education was free, acceptable from all the religious, and supported womens' right to education. Also, the literacy rates of education increased from from 52% in 1977 to 80% in 1987. After 2003, the education got worse because of the terrorists' attacks, kidnapping, low level of education, and living expenses. According to UN High Commissioner for Refugees (UNHCR), in the period between 2003 and 2008, there were 31,598 attacks against the Iraq's educational institutions, and 259 academics were killed by a terrorist group. For that, the illiteracy rates increased (Wilson, 2013).
- Resistance to change: for government employees, some were against transferring to the digital system because they saw that it was a threat to them and could cause losing their jobs and power. Some resisted because this kind of project might terminate the corruption. For citizens, the trust can be a factor that decreases the participation in this project.
- Poverty: poverty can be an issue because some people cannot afford buying a computer, or the price of Internet connection.
- Electricity: it is one of the biggest issues in the whole country, especially in the south. With the difficulty of living and the shortage in the electricity hours, people need to spend money for providing the electricity. They pay a lot of money to government

for the few hours, pay to the owner of the private generators for specific hours, also pay for gas if they have their own generator.

- Digital Divide, mostly in rural areas.
- ICT skills: for Amarah, the center of the city has more interaction with technologies. There is no statistic about the percentage of the ICT skill in the city, but from other factors, the percentage could be predictable, not a high percentage. There are many rural areas in the city where people are not really interested in technologies.

Most of the strategies of the case studies that related to the improving ICT sector are pretty good, though some are difficult to follow because of the political and economic issues for Iraq, but the Council of the city can focus on increasing the awareness of the citizens, increasing the e-literacy, and improving the employees' ICT skills. Also, they could try to find support from some organizations like the UN that might help and support countries like Iraq. For example, from the case studies, Kuwait asked Singapore for help in their implementation of e-government.

4.1.4 Technological Factor

Almost all the case studies that mentioned before began developing their ICT infrastructure before processing the e-government project. After all the damage in the infrastructure of Iraq after 2003 and with all the economic problems, it is difficult to build a strong infrastructure and especially in ICT sector. Amarah is one of the cities that is trying to develop the process of the governance and its services by involving the ICT in the daily life and moving to the electronic system. However, the city suffers from different issues, such as:

- Poor ICT infrastructure.
- High expense for the cost of Internet and computers.
- Power shortages.
- Lack of ICT skills for the employees.

The process that Kuwait followed to implement its e-government could be followed by Amarah. The first step that Emir of Kuwait asked for was to determine the e-readiness to check if the country and its people were ready to this project or not. Amarah should implement one of the e-readiness assessments to determine ways to develop the ICT sector and successfully implement the e-government project. It may take time until implementing the project, but it should build on a strong infrastructure and increase the awareness to guarantee the success of the project in the future.

4.2 Interoperability Framework (IF)

4.2.1 Introduction

Interoperability Framework (IF) is a set of policies, guidelines, and standards that describe the way of connection between different organizations ("What is Interoperability Framework | IGI Global", n.d.).

There are two different Interoperability Framework (IF) that are used by many countries to implement their e-government which are e-Government Interoperability Framework (e-GIF) and Federal Enterprise Architecture (FEA). In reference (Fillottrani & Estévez, 2010), e-Government Interoperability Framework (e-GIF) established by the UK government in

2000, includes sets of specifications and policies that need to be followed to build e-government, and its technical standard updates every six months. Also, it focuses on five areas which are data integration, interconnectivity, e-services access, business domains, and management. The other approach that was issued by the USA called Federal Enterprise Architecture (FEA), is based on the Enterprise Architecture. FEA defines this as a guideline that a government needs to follow to implement the EA. It consists of five reference models, for Version 1 are Performance Reference Model, Business Reference Model, Service Component Reference Model, Data Reference Model, and Technical Reference Model. The references for Version 2 are Performance Reference Model, Business Reference Model, Data Reference Model, Application Reference Model, Infrastructure Reference Model, and Security Reference Model.

In reference (Sekkai, 2011)**,** the aim of E-GIF is to improve the interoperability between the public sector (administrations and services), and the aim of FEA is to enhance the interoperability between the federal agencies that have different systems.

4.2.2 Adopt the e-Government Interoperability Framework (e-GIF)

In reference (e-Government Interoperability Framework Version 6.1, 2005), e-Government Interoperability Framework (e-GIF) is "sets out the government's technical policies and specifications for achieving interoperability and Information and Communication Technology (ICT) systems coherence across the public sector." (p. 4).

The reasons to adopt e-GIF are the integration of data that is gathered from different agencies can enhance the process of decision making, improving the cooperation between the private

and public sector. This can prevent duplication, which can save the government resources and increase the interaction between the government and their citizens by enabling the seamless flow of information across all the public organizations (*e-Government Interoperability Framework – Standards and Technical Guidelines (e-GIF),* 2016).

4.2.3 Suggestion to implement e-Government Interoperability Framework for Amarah

This thesis is to prove that implementing the same steps and methods of other successful implementations of e-government cannot be a good strategy that any country should follow. However, Amarah can observe and learn from other countries ways to avoid the challenges, lookout on the advanced technologies, or determine which country has the best experts in this field and ask to provide training for the Iraqi IT staff.

The suggestion framework may have some similarity to other countries, but it could be a start to focus on some points to develop the city's own framework, especially the difficulties to get accurate information about the current situation for the project. It's important not to lose communication with the e-government department in Amarah because of the critical situation in the country, and its war against ISIS.

In reference (*e-Government Interoperability Framework – Standards and Technical Guidelines (e-GIF),* 2016), e-GIF provides a framework that can be used to integrate, and share data and applications among all the government organizations by using standards and policies. The diagram below shows the framework that can help the city to build its e-government.

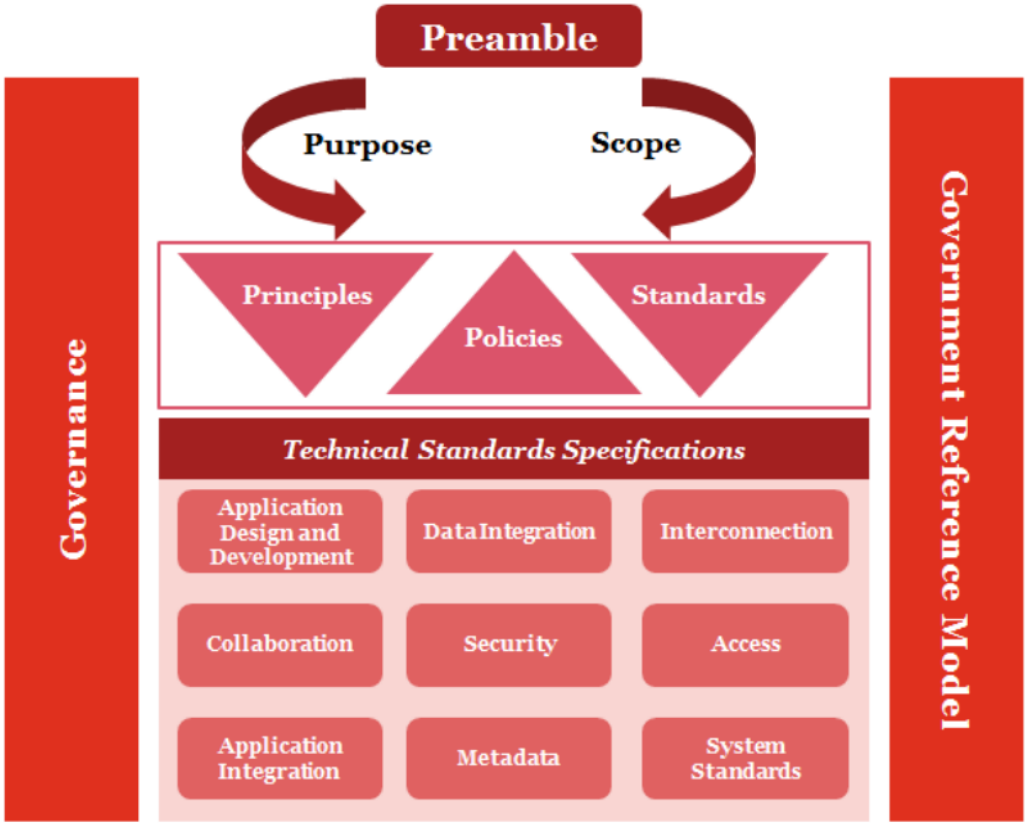

Figure 14. E-government interoperability framework. Reprinted from *e-Government Interoperability Framework – Standards and Technical Guidelines (e-GIF),* (p. 5), 2016. Reprinted with permission.

The components of the framework are as the following:

- Preamble: it covers the purpose and scope of e-GIF.
    - Purpose: the Council in this level should determine its vision and targets. The purpose of Amarah e-government is to increase the efficiency for the governance and eliminate the corruption.
    - Scope: all the agencies and government departments need to comply with the Amarah e-GIF, but it is not mandatory for citizens or the private sector (PricewaterhouseCoopers, 2010).

- Principles: in reference (PricewaterhouseCoopers, 2010), principles cover the policies and the standards for the project, and cover the limitations of the implementation. The following are the e-GIF principles:
  - Interoperability: this principle is to ensure that the standards chosen are providing the interoperability. This can be done by removing all the ICT in all the government departments and agencies that cannot communicate, and finding an effective way to interconnect, share, and integrate data and applications. The Council of Amarah needs to update their ICT infrastructure, and recycle the devices (computers) so the people with the limited income can afford them and therefore, increase their e-literacy.
  - Share, Re-Use and Collaborate: making sure that all the policies and standards are flexible, can reuse at all the government levels and can reduce the administrative.
  - Scalability: principles ensure that the policies and standards that have been chosen are flexible for any future growth in the agencies, applications, or data. For Amarah case, it should begin with limited areas (urban) and at the same time develop the infrastructure of the rural areas. For that, the council needs to provide principles that can work with the future growth in the rural areas.
  - Confidentiality: providing policies and standards to ensure confidentiality, and secure the information for citizens, business, and government. However, the technical standards are not enough to provide the protection, it should be inter-organizational agreements with laws for cybercrime. They should focus on this one because it increases the participation and interaction with the project.
  - Adherence to open standards: open standards are not meaning that all the standards should be open sources, some of them can be open sources because government cannot

use them in all the government levels. For example, open sources can fit the operating systems or servers. Using the open standards can affect the product's price by decreasing the price because the domination of some markets.

- Policies: in reference (PricewaterhouseCoopers, 2010), policies are guidelines to implement, control, and maintain the e-GIF, for the success of any initiative is depending on the policies and the standards. Government should apply the policies to all the agencies and ministries with some exceptions. The following are some of the importance policies that should be followed to guarantee the success for the initiatives. These policies cover the technical and organizational areas:
    - Overall e-GIF Guidelines: all the policies and standards should be based on the purpose and scope of e-GIF. Also, the exact policies should apply to all the ministries and the agencies.
    - Application and technology guidelines.
    - Data and meta-data guidelines.
    - Security guidelines.
    - Data protection guidelines.

- Standards: these are as a basis to develop new technologies, improve and share the existing one (*e-Government Interoperability Framework – Standards and Technical Guidelines (e-GIF),* 2016).

- Government Reference Model: it is a set of standards that are required for applications, devices, and systems to ensure the the scalability, interoperability, and use of the open

standards (*e-Government Interoperability Framework (e-GIF) Royal Government of Bhutan*, 2014).

- Governance: the objectives of governance are to monitor the maintenance, development, and the compliance of e-GIF standards across the government (*e-Government Interoperability Framework (e-GIF) Royal Government of Bhutan*, 2014).

- Technical Standards Specifications: there are nine technical standards that should be considered:
  - Interconnection: in reference (PricewaterhouseCoopers, 2010), it includes the interoperability infrastructure and technical specifications that are required for communication between different systems and share the information between them. It covers three areas which are:
    - Telecom Level that is divided into three sections which are Access Transmission Network Standard, Fixed Line Next-Generation Network Standard (FL-NGN), and 2nd and 3rd Generation Mobile Network Standard.
    - Enterprise Level that is divided into three sections which are Physical Infrastructure Layer Standard, Enterprise Level IP Network Layer Standard, and Protocol Layer Standard.
    - Integrated System that is divided into two sections which are Internet Service Providers Standard, and Financial Services Connectivity Standards.

- Data Integration: it is the standard that is responsible for the transformation of data. Also, it covers the technical specifications that support the data recognition (maps, text, image), interpretation format, codes, and recognition methods. So, the components of data integration are Character and Encoding for Information Interchange, Data description, Data exchange & Transformation, Data exchange Formats, Ontology-based information exchange, Data modeling language, Data integration meta language, Minimum interoperable character set, Digitization, Data Definition for Smart Card.

- Access: it is about enabling users to access to a certain service and information by set of delivery channels (World Wide Web) and devices (Phone or computer). Also, there are standards that are related to security to provide privacy and secure access. The components could be Access Token, Animation, Compression, Kiosk, Mobile devices, Scripting, Smart Card, Web Access standard, Web browser, Workstations, and Directory Access (*e-Government Interoperability Framework – Standards and Technical Guidelines (e-GIF)*, 2016).

- Collaboration: it covers the technical specifications that are required to collaborate, share information and services for users over the Internet, such as Email System, Enterprise Content Management, IP Telephony, and Video Conferencing (*e-Government Interoperability Framework – Standards and Technical Guidelines (e-GIF),* 2016).

- Application Design and Development: it is the standards that are used to facilitate application design and development for mobile and computers. Its components are Application Development For Hand-held Device, Application development framework, Business Rules, Logic and Objects, Commercial, off-the-shelf applications(COTS), Geographic information system, Modeling design and development, Programming language for Application Development, Reporting tools, Software configurations Management (SCM), Service Oriented Architecture, and Smart Card Applications (*e-Government Interoperability Framework – Standards and Technical Guidelines (e-GIF),* 2016).

- Application Integration: it is the standards and specifications for design and developed applications. The components are Message Oriented Middleware, Object Request Brokers, and Remote Procedure Calls (*e-Government Interoperability Framework – Standards and Technical Guidelines (e-GIF),* 2016).

- System Standards: it is a group of standards that relate to applications, web, database, storage devices, mobile, backup and recovery, and server operating systems.

- Metadata: there are other standards and specifications that relate to business like finance, health, learning, and others depending on specific content-related information (*e-Government Interoperability Framework – Standards and Technical Guidelines (e-GIF),* 2016).

- Security: it covers the standards and technical specifications to secure the access to information and services, and secure the exchange of information. The components could be Anti-Spam, Anti-Virus/Anti Spywar, Desktop Firewall, Digital Signature, Email Security, Encryption Algorithm, Enterprise Firewall, Identity Management, Intrusion Detection and Prevention, IP Encapsulation Security, IP Security, Proxy Server, Secure Transport, Virtual Private Network, XML Security Standards, Physical Security, and Remote Security (*e-Government Interoperability Framework – Standards and Technical Guidelines (e-GIF),* 2016).

Chapter 5: Recommendations and Conclusion

5.1 Recommendations

The design of e-government should be close to the reality of the city situation, for following other steps cannot be a wise way to implement the project especially to Amarah. The Council could follow some of the recommendation steps to implement their project, such as:

1. Implementing the e-readiness to have an idea about the readiness of the city to implement the project.
2. Determine the objectives of the project, trying to involve the public to express their ideas and opinions about what their expectations and what they want from the project.
3. Trying not to implement all the initiatives, or set up all the infrastructure (Hardware and Software) at once because there is no point of implementing a project that would not be used by the beneficiaries. Also, try to make the project scalable for future growth.
4. Increasing the awareness of the concept of e-government among the citizens. Trying to use the TV, internet, Ads, School, and other ways to spread the importance of moving to the electronic system.
5. Providing training centers for the limited income citizens to enhance the e-literacy. Also, involve the ICT in the education system.
6. Putting a long term plan to implement the project and taking all the required permissions from the current government to ensure the following administrations will not change their support, or cut their funding support for the project.

7. Improving the IT skills for the staff that will work on the project.
8. Amarah Council should cover other sectors that can effect on the project, such as improving economic and the health system, solving the power shortage problem, and encouraging and supporting the private businesses.
9. Improving the ICT infrastructure for the city.
10. Asking for help from the experts in this field, such as a foreign support.
11. Initializing a national Database (Census Database) to the city that has all the required information for the citizens, and providing security and privacy for the information.
12. Trying to find other advanced ways to implement the project that can be less expensive and consume less time with things such as using the cloud Computing.
13. From all the experiences from the case studies, it is concluded that Amarah should initial a committee to be responsible for monitoring and managing the project, such as in the Kuwait case when the Central Technical Body (CTB) was established to be responsible to manage and organize the work between the National Higher Committee and the organizations, and to prepare and determine the required IT to create a framework for the e-government.
14. Government should focus on developing the Iraqi staff instead of hiring foreign experts. By doing this, it will be less expense, decrease the unemployment rates, and increase the citizens' trust that the government is on the Iraqi side.

5.2 Conclusion

Transferring to the electronic system should be in the priorities of any government, especially Iraq. The implementation of this project is not easy with all the politics, economics, and other issues that confront the country now. However, if the government looks for the advantages for its citizens, it will place the project on the top of its priorities. Processing services online might save people's lives because the terrorists' attacks that didn't stop since 2003, increase the efficiency of the government, encourage the private businesses to interact with the new government, decline the corruption that effects on the country economic, ensure the equality in society, and focus on the other issues in the community.

The aim of this thesis was to prove that implementing the exact framework or follow the exact steps of other successful e-government implementation does not mean it would be a reason for the success of the project for other countries. From the case studies of the most successful e-governments around the world, each one has its method to process and implement its e-government depending on its IT infrastructure, economics, politics, and other factors that affect implementation. Showing the case studies, and analyzing the current situation for the country and Amarah City can point out some of the challenges that can influence the process of implementation and their solutions. Also, learning from other experiences in this field will highlight sectors that need to develop and support and in turn it will create a developed society. This could increase the e-literacy by providing training and enhancing the education system, highlighting the role of the government to enforce the project. This can be a reason for success of the project and encourage the customers to participate.

This thesis suggested a framework by using the e-Government Interoperability Framework

(e-GIF). In this framework, there were some points that Amarah Council should focus on, and needs to understand that the building an e-government is not just about providing computers, Database Storage, and Internet. There are other elements that need to be provided. Policies and standards applied to all the organizations that are connected to e-government should be concerned with the problems of power shortage, concerns about the city's economy, concerns about the education and the decreasing of literacy, and other important issues.

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